FINAL

ENVIRONMENTAL ASSESSMENT

HURRICANE KATRINA RECOVERY AND INSTALLATION DEVELOPMENT AT KEESLER AIR FORCE BASE, MISSISSIPPI

United States Air Force
Air Education and Training Command
Keesler Air Force Base, Mississippi

December 2006

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14. ABSTRACT

The 81st Training Wing at Keesler Air Force Base (AFB), Mississippi, proposes to implement Hurricane Katrina Recovery projects, other installation development projects based on the current Capital Improvements Program (CIP), and the requirements of the Base Realignment and Closure (BRAC) program as it relates to Keesler AFB. As part of the proposed action, the United States Air Force would demolish various buildings damaged by Hurricane Katrina and facilities that have exceeded their useful life implement construction of CIP projects to support installation development, and complete a community hospital addition (BRAC-related). The components of the current CIP include new building construction and alteration, replacement of old buildings, and demolition of some existing facilities. The proposed action is necessary at this time because there is a lack of available adequate facilities on Keesler AFB. Facilities that require replacement either were damaged by Hurricane Katrina, have deteriorated from heavy use, or are outdated. The proposed action would provide the necessary facilities to accomplish the mission of the 81st Training Wing. One action alternative is presented, which establishes and evaluates a potential development capability of Keesler AFB. This alternative includes developing Keesler AFB facilities to the maximum capability of the installation, increasing the number of assigned personnel to the base?s potential capability, and conducting flying operations at maximum sustainable levels. Resources considered in the impact analysis were noise aircraft operations and airspace, land use, earth resources, water resources, hazardous materials and waste, biological resources, utilities and infrastructure, socioeconomics, air quality, and cultural resources.

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FINDING OF NO SIGNIFICANT IMPACT
AND
FINDING OF NO PRACTICABLE ALTERNATIVE FOR
HURRICANE KATRINA RECOVERY AND INSTALLATION DEVELOPMENT
AT
KEESLER AIR FORCE BASE, MISSISSIPPI

AGENCY: Department of the Air Force, 81st Training Wing, Keesler Air Force Base (AFB), Mississippi.

PROPOSED ACTION AND ALTERNATIVES: The proposed action includes completion of the Hurricane Katrina Recovery projects, implementation of other installation development projects, and implementation of the Base Realignment and Closure Commission's final recommendations for Keesler Air Force Base. Approximately 2.2 million square feet of construction, 1.3 million square feet of construction or upgrade of pavements, and 2.2 million square feet of demolition would be accomplished. There would be no increases in population or aircraft operations. The alternative action includes development of Keesler AFB facilities to the maximum capability of the installation, increasing the number of assigned personnel, and conducting flying operations at maximum sustainable levels. Approximately 4.0 million square feet of buildings and 53 acres of pavement would be constructed along with 2.5 million square feet of demolition. The base population would increase by approximately 11,700 persons, to nearly 30,000. The alternative action includes the increase of C-130J flight operations by 60 percent, which would increase total aircraft operations by 15 percent. The no action alternative consists of continuing use of existing facilities at Keesler AFB to conduct technical training and aircraft operations at the current level.

SUMMARY OF FINDINGS: An Environmental Assessment (EA) was completed and is attached and incorporated by reference. It analyzed the proposed action, an alternative action, and the no action alternative. Direct, indirect, and cumulative impacts regarding noise, aircraft operations and airspace, land use, earth resources, water resources, hazardous materials and waste, biological resources, utilities and infrastructure, socioeconomics and environmental justice, air quality, and cultural resources were all analyzed. There are no significant impacts anticipated as a result of implementation of the proposed action, the alternative action, or the no action alternative. The impacts are summarized in the following section and discussed in detail in the attached EA.

Implementation of the proposed action would result in increases in impervious surfaces, infrastructure demand, and hazardous materials consumption and hazardous waste generation. However, best management practices would be employed to minimize erosion and impacts to water resources by the increased impervious surfaces, and the projected increase in demand on base infrastructure is not expected to create adverse impacts. Because hazardous materials and waste would be managed in accordance with existing protocols, impacts are expected to be minor. Anticipated increases in emissions are not expected to result in any meaningful long-term impacts to Harrison County or Air Quality Control Region 5. Land and persons located under the noise contours in the vicinity of Keesler AFB are not expected to increase. The proposed action is not expected to contribute appreciably to cumulative environmental impacts when considered in the context of other projects that have recently been completed, are currently under construction, or are anticipated to be implemented in the near future.

Implementation of the alternative action would result in similar impacts as the proposed action in all respects except noise. Land and persons located under the noise contours in the vicinity of Keesler AFB would increase. However, although acreage (and associated population) located beneath the noise contours would increase, the increase is not expected to be significant because land use would not be affected. As with the proposed action, the alternative action is not expected to contribute appreciably to cumulative environmental impacts.

SUMMARY OF PUBLIC REVIEW AND INTERAGENCY COORDINATION: The appropriate federal, state, and local agencies were provided copies of the Draft EA and Draft Finding of No Significant Impact/Finding of No Practicable Alternative and asked to submit comments. The Draft EA and Draft Finding of No Significant Impact/Finding of No Practicable Alternative were made available to the public and public agencies for 30 days. Notification of the 30-day comment period was placed in the *Biloxi Sun Herald* on October 22, 2006. No comments on the Draft EA and Draft Finding of No Significant Impact/Finding of No Practicable Alternative were received.

FINDING OF NO PRACTICABLE ALTERNATIVE: Pursuant to Executive Order 11988, and considering all supporting information, I find that there is no practicable alternative to the proposed implementation of the projects sited in a 100-year floodplain as described in the attached EA. The attached EA identifies all practicable measures to minimize harm to the existing environment. Construction of the proposed facilities will increase impervious cover to the area within the floodplain, however, the resulting increase in total impervious cover will have a minimal impact on the total volume of stormwater runoff on Keesler AFB.

DAVID H. DENTINO
Deputy Civil Engineer
Headquarters Air Education and Training Command

5 DEC 06
Date

FINDING OF NO SIGNIFICANT IMPACT: Based on my review of the facts and analysis in the EA, I conclude that neither the proposed action nor the alternative action will have a significant impact either by itself or considering cumulative impacts. Accordingly, the requirements of the *National Environmental Policy Act*, the Council on Environmental Quality Regulations, and 32 *Code of Federal Regulations* 989 have been fulfilled, and an environmental impact statement is not required and will not be prepared.

Richard P. Pierce

RICHARD P. PIERCE, COL, USAF
81st Training Wing Vice Commander

8 DEC 06
Date

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ACRONYMS AND ABBREVIATIONS

45 AS	45th Airlift Squadron
53 WRS	53rd Weather Reconnaissance Squadron
81 CES/CEV	81st Environmental Flight
81 TRW	81st Training Wing
85 EIS	85th Engineering Installation Squadron
815 AS	815th Airlift Squadron
%	percent
$\mu g/m^3$	micrograms per cubic meter
ACAM	Air Conformity Applicability Model
ACHP	Advisory Council on Historic Preservation
ACM	asbestos-containing material
AETC	Air Education and Training Command
AFB	Air Force Base
AFI	Air Force Instruction
AFRC	Air Force Reserve Command
AGE	aircraft ground equipment
AGL	above ground level
AICUZ	Air Installation Compatible Use Zones
amsl	above mean sea level
AOC	Area of Concern
APZ I	Accident Potential Zone 1
APZ II	Accident Potential Zone 2
AQCR	Air Quality Control Region
ARTCC	Air Route Traffic Control Center
ATC	Air Traffic Control
ATCAA	Air Traffic Control Assigned Airspace
AVGAS	aviation gasoline
bgs	below ground surface
BMP	best management practices
BRAC	Base Realignment and Closure
CAA	*Clean Air Act*
CIP	Capital Improvements Program
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act*
CEQ	Council on Environmental Quality
CFR	*Code of Federal Regulations*
CO	carbon monoxide
CRMP	Cultural Resources Management Plan
CWA	*Clean Water Act*
C&D	construction and demolition
dB	decibel
dBA	A-weighted decibel
DoD	Department of Defense
DOT	Department of Transportation
DRMO	Defense Reutilization and Marketing Office
DZ	Drop Zone
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ERP	Environmental Restoration Program
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FIP	Federal Implementation Plan
FL	flight level
FY	fiscal year
gpm	gallon per minute
GPT	Gulfport/Biloxi International Airport
HAP	hazardous air pollutant
HAZMAT	Hazardous Material
Hz	hertz
IFR	Instrument Flight Rule
IH	Interstate Highway
JLUS	Joint Land Use Study
JP-4	jet propellant-4
kts	knots
kV	kilovolt
kVA	kilovolt-amp
KWh	kilowatt-hour
L_{dn}	Day-Night Average Sound Level
L_{eq}	equivalent noise level
L_{max}	maximum sound level
lb	pound
LBP	lead-based paint

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FINAL

Environmental Assessment

Hurricane Katrina Recovery and Installation Development at Keesler Air Force Base, Mississippi

Department of the Air Force
81st Training Wing
Keesler Air Force Base, Mississippi

December 2006

Cover Sheet

COVER SHEET
ENVIRONMENTAL ASSESSMENT
HURRICANE KATRINA RECOVERY AND INSTALLATION DEVELOPMENT
KEESLER AIR FORCE BASE, MISSISSIPPI

Responsible Agency: Department of the Air Force, Air Education and Training Command, 81st Training Wing, Keesler Air Force Base, Mississippi.

Proposed Action: Hurricane Katrina Recovery and Installation Development at Keesler Air Force Base, Mississippi.

Point of Contact: Mr. George Daniel, 81st Environmental Flight (81 CES/CEVN), 508 L Street, Keesler AFB MS 39534, 228-377-5823. Comments are due by November 21, 2006.

Report Designation: Environmental Assessment

Abstract: The 81st Training Wing at Keesler Air Force Base (AFB), Mississippi, proposes to implement Hurricane Katrina Recovery projects, other installation development projects based on the current Capital Improvements Program (CIP), and the requirements of the Base Realignment and Closure (BRAC) program as it relates to Keesler AFB. As part of the proposed action, the United States Air Force would demolish various buildings damaged by Hurricane Katrina and facilities that have exceeded their useful life, implement construction of CIP projects to support installation development, and complete a community hospital addition (BRAC-related). The components of the current CIP include new building construction and alteration, replacement of old buildings, and demolition of some existing facilities. The proposed action is necessary at this time because there is a lack of available adequate facilities on Keesler AFB. Facilities that require replacement either were damaged by Hurricane Katrina, have deteriorated from heavy use, or are outdated. The proposed action would provide the necessary facilities to accomplish the mission of the 81st Training Wing.

One action alternative is presented, which establishes and evaluates a potential development capability of Keesler AFB. This alternative includes developing Keesler AFB facilities to the maximum capability of the installation, increasing the number of assigned personnel to the base's potential capability, and conducting flying operations at maximum sustainable levels. Resources considered in the impact analysis were noise, aircraft operations and airspace, land use, earth resources, water resources, hazardous materials and waste, biological resources, utilities and infrastructure, socioeconomics, air quality, and cultural resources.

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Purpose of and Need for Action

CHAPTER 1

PURPOSE OF AND NEED FOR ACTION

The Commander of the 81st Training Wing (81 TRW) proposes Hurricane Katrina Recovery projects and installation development activities based on the current Capital Improvements Program (CIP), as well as the implementation of the requirements of the Base Realignment and Closure (BRAC) program as it relates to Keesler Air Force Base (AFB). As part of the proposed action, the United States Air Force (USAF) would (1) demolish various buildings damaged by Hurricane Katrina and facilities that have exceeded their useful life and (2) implement construction of replacement facilities and CIP projects. This Environmental Assessment (EA) consists of seven chapters covering the purpose and need for the proposed action, a detailed description of the proposed action and alternatives, a discussion of baseline environmental conditions, the environmental analysis, a list of preparers, the agencies and individuals contacted, and a list of source documents. This chapter presents the purpose of and need for the action, a description of the location, a description of the scope of the environmental review, an overview of environmental requirements, an introduction to the organization of this document, and a summary of public involvement.

1.1 PURPOSE OF AND NEED FOR ACTION

The Air Force must maintain its readiness with a highly educated and trained force structure. The Air Education and Training Command (AETC) is responsible for the quality training and education of Air Force personnel. Keesler AFB, an AETC installation, is the home of one of the largest technical training wings in the Air Force. The mission of the 81 TRW, the host unit at Keesler AFB, is to provide technical training in some skills for the Air Force, Air Force Reserve Command (AFRC), and the Air National Guard. The 81 TRW must provide all the logistics and support needed to fulfill training mission requirements.

The proposed action is necessary at this time because there is a lack of available adequate facilities on Keesler AFB. Facilities that require replacement were damaged by Hurricane Katrina, have deteriorated from heavy use, or are outdated. The proposed action would provide the necessary facilities to accomplish the mission of the 81 TRW.

1.2 LOCATION

Keesler AFB is located within the city limits of Biloxi, Harrison County, Mississippi (Figure 1-1). The installation encompasses approximately 1,678 acres. The base is bordered on the east, west, and south sides by residential and commercial areas. The Back Bay of Biloxi forms the northern border of the base. The southern boundary of the installation is approximately one-half mile north of the Mississippi Sound, which is part of the Gulf of Mexico. United States (US) Highway 90 parallels the southern border of the installation and provides access to Interstate Highway (IH) 10 by US Highways 49 and 110.

Figure 1-1 Site Location Map

1.3 SCOPE OF THE ENVIRONMENTAL REVIEW

The *National Environmental Policy Act* of 1969 (NEPA), as amended, requires federal agencies to consider environmental consequences in the decision-making process. The President's Council on Environmental Quality (CEQ) issued regulations to implement NEPA that include provisions for both the content and procedural aspects of the required environmental analysis. The Air Force Environmental Impact Analysis Process is accomplished through adherence to the procedures set forth in CEQ regulations (40 *Code of Federal Regulations* [CFR] Sections 1500-1508) and 32 CFR 989, *Environmental Impact Analysis Process*. These federal regulations establish the administrative process and substantive scope of the environmental impact evaluation that are designed to ensure that deciding authorities have a proper understanding of the potential environmental consequences of a contemplated course of action. The Air Force plans to prepare an EA for this proposal. The CEQ regulations require that an EA:

- Provide sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact.
- Facilitate the preparation of an EIS when required.

This EA identifies, describes, and evaluates the potential environmental impacts that may result from implementation of the Hurricane Katrina Recovery projects, the CIP, and BRAC projects (the proposed action); implementation of the potential development alternative (the alternative action); and the no action alternative. As appropriate, the affected environment and environmental consequences of the proposed action and alternatives may be described in terms of site-specific descriptions or a regional overview. Finally, the EA identifies measures to reduce impacts or best management practices (BMP) to prevent or minimize environmental impacts, if required.

The resources that could be impacted and will therefore be analyzed in the EA include noise, aircraft operations, air space, land use, earth resources, water resources, hazardous materials and waste, biological resources, utilities and infrastructure, socioeconomics, air quality, and cultural resources. Assessment of safety and health impacts is not included in this document; all contractors would be responsible for compliance with applicable *Occupational Safety and Health Act* regulations concerning occupational hazards and specifying appropriate protective measures for all employees.

Other actions or potential actions that may be concurrent with the proposed action could contribute to cumulative impacts. The environmental impacts of these other actions are addressed in this EA only in the context of potential cumulative impacts, if any. A cumulative impact, as defined by the CEQ (40 CFR 1508.7), is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

1.4 ENVIRONMENTAL JUSTICE

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* was issued by the President on February 11, 1994. In the EO, the President instructed each federal agency to make "…achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Adverse is defined by the Federal Interagency Working Group on Environmental Justice as "…having a deleterious effect on human health or the environment that is significant, unacceptable, or above generally accepted norms."

Renovation, demolition, and construction activities associated with this project would cause short-term increases in air and noise emissions for the duration of construction activities. Short-term impacts associated with surface water and drainage would be localized to the construction sites and minimized through implementation of a Storm Water Pollution Prevention Plan (SWPPP). Short-term solid waste impacts would be limited to the construction and established disposal sites; and short-term traffic congestion would primarily occur on and around Keesler AFB and would equally affect all who travel in the area. Expenditures associated with project activities would have a short-term positive impact on the local economy. It is assumed that workers, both skilled and unskilled, would be drawn from the available work force.

All proposed construction and demolition activities would occur on base. Any potential impacts to the human environment would be limited to the physical property of the base (e.g., noise, land use, etc.) or evenly distributed across the region of influence (e.g., air quality, socioeconomics, etc.). As a result, the proposed action and alternative action would not target any particular demographic area. No disproportionately high impacts to low-income or minority populations would occur as a result of proposed construction or demolition activities associated with either the proposed action or alternative action. Section 3.3.9 describes the existing conditions associated with the environmental justice analysis, and Section 4.3.9 provides the environmental justice analysis.

1.5 APPLICABLE REGULATORY REQUIREMENTS

Regulatory requirements potentially applicable to the proposed action and alternatives are presented in Table 1-1.

1.6 INTRODUCTION TO THE ORGANIZATION OF THE DOCUMENT

This EA is organized into seven chapters. Chapter 1 contains a statement of the purpose of and need for action, the location of the proposed action, a summary of the scope of the environmental review, discussion of environmental justice analysis requirements, identification of applicable regulatory requirements, an introduction to the organization of the EA, and a public involvement summary.

Chapter 2 contains a brief introduction, describes the history of the formulation of alternatives, describes the alternatives eliminated from further consideration, provides a detailed description of the proposed action, identifies other action alternatives, summarizes other known actions for Keesler AFB, identifies the preferred alternative, identifies measures to reduce impacts (if required), and provides a comparison matrix of environmental effects for all alternatives.

Chapter 3 contains a general description of the biophysical resources that could potentially be affected by the proposed action or alternatives. Chapter 4 is an analysis of the environmental consequences. Chapter 5 lists preparers of this document. Chapter 6 lists persons and agencies consulted in the preparation of this EA. Chapter 7 is a list of source documents relevant to the preparation of this EA.

Appendix A contains copies of all interagency correspondence regarding the proposed action. The *Capability Analysis* on which the alternative action (potential development alternative) was based is included in Appendix B. Appendix C contains the socioeconomics impact calculations. Appendix D contains the Notice of Availability (*to be included in the Final EA*).

1.7 PUBLIC INVOLVEMENT SUMMARY

The Keesler AFB 81st Environmental Flight (81 CES/CEV) published a Notice of Availability in the *Biloxi Sun Herald* on October 22, 2006, announcing the 30-day review period for the Draft EA which closed on November 21, 2006. The review period afforded the public and appropriate federal, state, and local agencies the opportunity to review and comment on the EA. No comments were received during the public comment period.

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Table 1-1 Potentially Required Federal Permit, License, or Entitlement

Federal Permit, License, or Entitlement	Typical Activity, Facility, or Category of Persons Required to Obtain the Federal Permit, License, or Entitlement	Authority	Regulatory Agency
Title V permit under the *Clean Air Act* (CAA)	Sources subject to the Title V permit program include: Any major source: (1) A stationary source that emits or has the potential to emit 100 tons per year (tpy) of any pollutant (major source threshold can be lower in nonattainment areas). (2) A major source of air toxics regulated under Section 112 of Title III (sources that emit or have the potential to emit 10 tpy or more of a hazardous air pollutant or 25 tpy or more of any combination of hazardous air pollutants). Any "affected source" as defined in Title IV (acid rain) of the CAA. Any source subject to New Source Performance Standards under Section 111 of the CAA. Sources required to have new source or modification permits under Parts C [Prevention of Significant Deterioration (attainment areas)] or D [New Source Review (nonattainment areas)] of Title I of the CAA. Any source subject to standards, limitations, or other requirements under Section 112 of the CAA. Other sources designated by United States Environmental Protection Agency (USEPA) in the regulations.	Title V of CAA, as amended by the 1990 CAA Amendments	USEPA; Mississippi Department of Environmental Quality (MDEQ)
National Pollutant Discharge Elimination System permits	Discharge of pollutants from any point source into navigable waters of the United States, including applicable wastewater and stormwater.	§ 402 of *Clean Water Act* (CWA); 33 United States Code (USC), §1342	USEPA; MDEQ

CAA	*Clean Air Act*	USC	United States Code
CWA	*Clean Water Act*	USEPA	United States Environmental Protection Agency
MDEQ	Mississippi Department of Environmental Quality	USFWS	Unites States Fish and Wildlife Service
tpy	tons per year		

Table 1-1, Continued

Federal Permit, License, or Entitlement	Typical Activity, Facility, or Category of Persons Required to Obtain the Federal Permit, License, or Entitlement	Authority	Regulatory Agency
National Historic Preservation Act consultation	Excavation and/or removal of archaeological resources from public lands or Indian lands and carrying out activities associated with such excavation and/or removal.	National Historic Preservation Act, § 106	United States Department of the Interior - National Park Service, Mississippi Department of Archives and History
Endangered Species Act § 7 consultation	Taking endangered or threatened wildlife species; engaging in certain commercial trade of endangered or threatened plants or removing such plants on property subject to federal jurisdiction.	§ 7 of Endangered Species Act, 16 USC § 1539; 50 Code of Federal Regulations 17 Subparts C, D, F, and G	Unites States Department of the Interior - Fish and Wildlife Service (USFWS), Mississippi Wildlife, Fisheries, and Parks
CWA § 404 permit	Actions to reduce the risk of flood loss to minimize the impact of floods on human safety, health, and welfare; to restore and preserve the natural and beneficial values served by floodplains; actions to minimize destruction, loss, or degradation of wetlands; and to preserve and enhance the natural and beneficial values of wetlands.	Executive Orders 11988 and 11990, § 404 of CWA, 33 USC § 1251	United States Army Corps of Engineers, USFWS

CAA	Clean Air Act	USC	United States Code
CWA	Clean Water Act	USEPA	United States Environmental Protection Agency
MDEQ	Mississippi Department of Environmental Quality	USFWS	Unites States Fish and Wildlife Service
tpy	tons per year		

Chapter 2

Description of Proposed Action and Alternatives

CHAPTER 2

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

This chapter is composed of eight sections: an introduction, a brief history of the formulation of alternatives, identification of alternatives eliminated from further consideration, a description of the no action alternative, a detailed description of the proposed action, a detailed description of other action alternatives, a general description of other projects that may have the potential to impact the region when cumulative effects are considered, and a comparison matrix that summarizes the environmental effects of each alternative.

2.2 HISTORY OF THE FORMULATION OF ALTERNATIVES

The alternatives developed for the proposed action at Keesler AFB are designed to capture the range of possible development and activity levels at Keesler AFB from the no action alternative to the potential development alternative. The *Capability Analysis* (Appendix B) identified expansion potential of the current mission activity of Keesler AFB for the planning period ending in the year 2013. For the purposes of this EA, all projects performed or planned from the baseline (fiscal year [FY] 2004) to the end of the planning period (FY2013) were included. Three viable alternatives were identified:

- No Action Alternative: continue use of existing facilities at Keesler AFB and continue technical training and aircraft operations at the current level.
- Proposed Action: (1) implement the Hurricane Katrina Recovery projects, (2) implement construction to accomplish the CIP including demolition of facilities that are either dilapidated or in the footprint of proposed CIP construction, and (3) implement the BRAC program as it relates to Keesler AFB.
- Potential Development Alternative: develop facilities to the capability of the installation and conduct technical and flying operations at potential levels as quantified in the *Capability Analysis*.

2.3 IDENTIFICATION OF ALTERNATIVES ELIMINATED FROM CONSIDERATION

No additional alternatives were considered because the three alternatives provide the full range of potential impacts: from no development (the no action alternative) to implementing the development potential of Keesler AFB through the planning period ending in 2013 (the alternative action).

2.4 NO ACTION ALTERNATIVE

Under the no action alternative, there would be no increase in personnel or mission activity at Keesler AFB and no construction or demolition would be accomplished in Hurricane Katrina Recovery projects, the CIP, or the BRAC program projects relating to Keesler AFB. The no action alternative would limit the base's ability to conduct its mission successfully and to maintain wartime readiness and training.

2.5 DETAILED DESCRIPTION OF THE PROPOSED ACTION

Under the Proposed Action, the 81 TRW at Keesler AFB would implement the Hurricane Katrina Recovery projects, installation development activities based on the current CIP, and BRAC-related projects. The components of the CIP would include new building construction and alteration, replacement of old buildings, and demolition of selected existing facilities.

The implementation of the Hurricane Katrina Recovery projects would consist of the construction of 761,699 square feet of new space, the associated demolition of 767,769 square feet of buildings, and the construction of approximately 980,000 square feet of pavements. New construction and related demolition would be required for the following Hurricane Katrina Recovery projects: Hospital Energy Plant and Imaging Center, Training Aids Facility, Refuel Maintenance Facility, Hanger 5, Base Exchange, Commissary, Postal Center, Library, Consolidated Club and Golf Club House, Recreation Center, Recreational Vehicle (RV) Park, and Construction Camp.

The Keesler AFB CIP includes the construction of 1,196,350 square feet of new space and the construction or upgrade of 353,000 square feet of roadway. Approximately 1,122,370 square feet of facilities would be demolished. Major components of the CIP support the 403rd AFRC, 81 TRW, Second Air Force, Noncommissioned Officer Academy, and Airmen Leadership School. CIP projects include the following: projects in the permanent party dormitories complex, industrial area development, Division Street and Main Gate/Visitor's Center improvements, and flightline and headquarters development complexes.

Approximately 270,500 square feet of existing hospital facilities would be renovated (340,000 square feet of demolition) and converted into a hospital for the Gulf Coast community as part of the BRAC program.

A portion of Keesler AFB is located within the 100-year floodplain, and all but three facilities addressed under the proposed action would be located outside the 100-year floodplain. However, the Base Exchange and Commissary projects associated with Hurricane Katrina Recovery would construct replacements for facilities currently located completely within the 100-year floodplain. Specifically, the proposed parking lot associated with this project and part of the Base Exchange would be located within the floodplain due to the size of the Base Exchange/Commissary complex and lack of available open space at Keesler AFB. Construction of the Base Exchange and Commissary facilities would include the elevation of the buildings' foundations by the addition of fill material to raise the elevation of the facilities out of the floodplain.

The Main Gate/Visitor's Center improvements project included in the Keesler AFB CIP would be located in the 100-year floodplain. The project was originally designed to enter the base and travel north to Meadows Avenue and be located out of the floodplain. The original plan had to be altered after Hurricane Katrina to enable the Air Force to place larger facilities on the highest ground possible to help minimize the risk to high priority facilities. Due to the re-siting, the Main Gate projects were rerouted south through the floodplain. The Hurricane Katrina Recovery project including construction of an RV Park and Construction Camp would also be constructed in the floodplain to utilize the Harrison Court area. The proposed location of these facilities in the floodplain is practical because this provides adequate areas outside of the floodplain to build higher priority replacement facilities. Given the current configuration, land use constraints, and location of Keesler AFB, both the proposed action and alternative action would involve some construction and demolition activities in the floodplain.

All programmed projects with identified locations (including major construction, minor construction, and pavement projects) are summarized in Table 2-1. Unless otherwise noted, the square foot values apply to building construction or demolition. Figures 2-1 and 2-2 show the project construction locations, and associated project demolition locations are shown on Figures 2-3 and 2-4.

2.6 POTENTIAL DEVELOPMENT (ALTERNATIVE ACTION)

The alternative action consists of the development of Keesler AFB to its potential for the planning period beginning in FY2004 and ending in the year FY2013. This alternative is based on the development potential quantified in the *Capability Analysis* (Appendix B).

The development potential was determined in the *Capability Analysis* for the planning period ending in FY2013 as follows: (1) maximum available land was calculated, (2) basis for sustainable population growth through the end of the planning period was determined, (3) maximum developable land and sustainable populations with respect to potentially limiting factors such as potable water resources and other utility system resources was evaluated, and (4) noise environment surrounding the Keesler AFB airfield and training airspace to determine the growth potential for the flying mission was evaluated.

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Table 2-1 Project List, Proposed Action

Project Number	Description/Location	Type of Project (CIP/Hurricane Katrina Recovery/BRAC)	Construction (square feet)	Demolition (square feet)	Summary
Permanent Party Dormitory Area Development					
1	Pecan Dining Hall	CIP	19,615	22,950	The existing facility was built in 1951 and is currently in poor condition. A modern and efficient dining facility is required to accommodate the enlisted personnel and will improve morale, provide more effective food preparation and distribution, and reduce current operating and maintenance expenses.
2	Dormitory (144 person)	CIP	51,150	52,360	The dormitory assessment for the existing facilities noted significant deficiencies in the mechanical and electrical systems. The facility is required to provide housing conducive to the proper rest, relaxation, and personal well-being of unaccompanied enlisted personal and will aid in the retention of these highly trained airmen.
3	Dormitory (144 person)	CIP	51,150	52,360	The dormitory assessment for the existing facilities noted significant deficiencies in the mechanical and electrical systems. The facility is required to provide housing conducive to the proper rest, relaxation, and personal well-being of unaccompanied enlisted personnel and will aid in the retention of these highly trained airmen.

Table 2-1, Continued

Project Number	Description/Location	Type of Project (CIP/Hurricane Katrina Recovery/BRAC)	Construction (square feet)	Demolition (square feet)	Summary
Permanent Party Dormitory Area Development					
4	Dormitory (144 person)	CIP	51,150	52,360	The dormitory assessment for the existing facilities noted significant deficiencies in the mechanical and electrical systems. The facility is required to provide housing conducive to the proper rest, relaxation, and personal well-being of unaccompanied enlisted personnel and will aid in the retention of these highly trained airmen.
5	Dormitory (144 person)	CIP	51,150	52,360	The dormitory assessment for the existing facilities noted significant deficiencies in the mechanical and electrical systems. The facility is required to provide housing conducive to the proper rest, relaxation, and personal well-being of unaccompanied enlisted personnel and will aid in the retention of these highly trained airmen.
6	Dormitory (96 person)	CIP	51,150	52,360	The dormitory assessment for the existing facilities noted significant deficiencies in the mechanical and electrical systems. The facility is required to provide housing conducive to the proper rest, relaxation, and personal well-being of unaccompanied enlisted personnel and will aid in the retention of these highly trained airmen.

Table 2-1, Continued

Project Number	Description/Location	Type of Project (CIP/Hurricane Katrina Recovery/BRAC)	Construction (square feet)	Demolition (square feet)	Summary
Medical Area Development					
7	Community Hospital Addition	BRAC	270,500	340,000 (renovation)	Convert the existing facility into a hospital for the Gulf Coast community by constructing a multi-story replacement inpatient tower and renovating areas for administrative functions and consolidated outpatient treatment.
8	Hospital Central Energy Plant	Hurricane Katrina Recovery	164,150	246,000	The current facility was extensively damaged during Hurricane Katrina. The electrical transformers, generators, and switchgear sustained water damage and a catastrophic electrical failure ensued. The electrical failure caused the evacuation of all inpatients (including ventilator patients) and essential staff. A new energy plant would be constructed to replace the existing electrical system.
	Hospital Imaging Center	Hurricane Katrina Recovery	41,530		A modern, functional, hurricane-protected diagnostic imaging center is required to provide care for base beneficiaries.
9	Air Force Reserve Command Aero Medic Staging Facility	CIP	11,490		The existing staging facility is substantially undersized to accommodate missions of the unit. The current facility was designed and built for a squadron of 65 persons. An adequately sized facility is required to accommodate the assigned personnel to support the 403rd Aeromedical Staging Squadron, which supports a 100-bed medical unit with a physical exam unit.
10	Construct Fisher House Addition	CIP	12,300		Construct an addition to the Fisher House.

Table 2-1, Continued

Project Number	Description/Location	Type of Project (CIP/Hurricane Katrina Recovery/BRAC)	Construction (square feet)	Demolition (square feet)	Summary
Headquarters Area Development					
11	Education Center	CIP	45,000	31,000	Construct a new facility to support the Airmen Leadership School, Noncommissioned Officer Academy, and First Term Airmen's Center.
12	Headquarters Center	CIP	44,000	45,700	Construct a new facility to house the 81st Training Wing and Second Air Force.
Training Vision Area Development					
13	Training Facility	CIP	144,000	11,100	Construct a new training facility to replace Hewes Hall.
14	Training Facility	CIP	160,000	32,000	Construct a new training facility to replace Wolfe Hall.
15	Training Facility	CIP		111,000	Renovate Bryan Hall Training Facility.
16	Training Facility	CIP		102,000	Renovate Jones Hall Training Facility.
17	Training Facility	CIP	69,000		Training Facility Phase 3 - Construct a 69,000-square foot, three-story training facility for replacement of training in Hangar 3.
18	Training Facility	CIP	142,000	123,600	Training Facility Phase 4 - Construct a 142,000-square foot, three-story training facility for replacement of training in Allee Hall.

Table 2-1, Continued

Project Number	Description/Location	Type of Project (CIP/Hurricane Katrina Recovery/BRAC)	Construction (square feet)	Demolition (square feet)	Summary
Training Vision Area Development					
19	Training Aids Facility	Hurricane Katrina Recovery	38,299	38,299	The roof of the existing facility was blown off during Hurricane Katrina, allowing water to infiltrate into the existing facility and cause major damage to the walls, ceiling, flooring, and electrical, mechanical, and fire alarm systems. The training school requires a facility that can fabricate and construct various training aid devices to support the technical training courses. Current mission training will be degraded if this facility is not constructed because no other facility is available.
Flightline Area Development					
20	Refuel Maintenance Facility	Hurricane Katrina Recovery	3,600	2,800	The existing refueler maintenance facility was destroyed by high winds during Hurricane Katrina. The maintenance facility is required to support aircraft fueling vehicles. Currently, there is no other facility that vehicle maintenance personnel can use safely to maintain aircraft fuel trucks.
21	Replace Hanger 5	Hurricane Katrina Recovery	140,000	140,000	The existing facility was extensively damaged during Hurricane Katrina. A consolidated aircraft maintenance facility is required to support the Air Force Reserve Command 403rd Wing's 18 assigned C-130 aircraft.
22	Demolish Biloxi Hanger (Hanger 0228)	CIP		15,800	Demolish Biloxi Hanger to accommodate construction of Port Training Facilities and warehouses.

Table 2-1, Continued

Project Number	Description/Location	Type of Project (CIP/Hurricane Katrina Recovery/BRAC)	Construction (square feet)	Demolition (square feet)	Summary
Flightline Area Development					
23	Construct 403rd Aerial Port Training Facility	CIP	26,265	82,250	The current facility is located in a portion of a former aircraft maintenance hanger built in 1941. This facility would require extensive renovations to upgrade functional, structural, and life/safety concerns. A properly sized and arranged new facility is required to train Air Force Reserve aerial port personnel to load and unload military cargo aircraft for air, land, and drop missions.
24	C-21 Maintenance Hanger	CIP	30,000	69,600	Construct a facility to support C-21 maintenance activities.
25	Air Force Reserve Command Warehouse	CIP	6,000	38,000	Mobility kits, equipment, and home station supplies are stored in the high bay area of the Wing Support Group Building and in seven bins in the parking lot. Pallet build-ups are conducted in the parking lot and there is no protection from adverse weather. A facility that provides covered storage for mobility supplies and equipment as well as home station training supplies for five squadrons of the 403rd Support Group is required to protect both the personnel working at the facility and the supplies being stored/located at the facility.
26	Control Tower	CIP	6,000	1,000	Construct a new facility to support control tower operations.

Table 2-1, Continued

Project Number	Description/Location	Type of Project (CIP/Hurricane Katrina Recovery/BRAC)	Construction (square feet)	Demolition (square feet)	Summary
Triangle Vision Area Development					
27	Student Fitness Center	CIP	184,230	63,270	The existing facility is not adequately sized to accommodate basketball, racquetball, and other court sports. Currently, the base swimming pools are open during summer months only and water training activities are conducted off base at a public facility during the winter. The construction of this facility is required to promote physical fitness training all year long and would enhance the quality of life of military students and their families.
Industrial Area Development					
28	Transportation Complex	CIP	39,000	111,300	Construct a facility to support transportation maintenance, operations, and storage.
General Area Development					
29	Anti-terrorism Force Protection Division Street Gate and Recreational Complex	CIP	1,700 (buildings) 353,000 (pavements) 300,000 (fields)		The existing Meadows Gate would be replaced with a new Division Street Gate, consolidated Visitor's Center, Pass and Registration office, Main Gate House, and expanded five-lane roadway with two lanes in each direction and a shared center turn lane. This project would be sited in the 100-year floodplain. A recreational complex would also be constructed within the 100-year floodplain as part of this project.

Table 2-1, Continued

Project Number	Description/Location	Type of Project (CIP/Hurricane Katrina Recovery/BRAC)	Construction (square feet)	Demolition (square feet)	Summary
General Area Development					
30	Replace Base Exchange	Hurricane Katrina Recovery	173,080	150,960	The existing facility was flooded during Hurricane Katrina. The existing mechanical and electrical systems were destroyed. The ceiling, walls, flooring, and other finishes have been damaged and mold and mildew have developed throughout the entire facility. The base facility is required to support assigned active duty, student, reserve, and retiree populations that work at the base or live in the local area. Part of the parking area would be in the 100-year floodplain.
31	Replace Commissary	Hurricane Katrina Recovery	99,230	96,910	The existing facility was flooded during Hurricane Katrina. The existing mechanical and electrical systems were destroyed. The ceiling, walls, flooring, and other finishes have been damaged and mold and mildew have developed throughout the entire facility. The facility is required to provide adequate commissary support for the authorized population. Currently, the commissary is being operated out of temporary facilities (former community club).
32	Replace Postal Center	Hurricane Katrina Recovery	9,690	7,320	The existing facility was extensively damaged by Hurricane Katrina. A central post office is required to support the base population, which includes permanent party personnel, Department of Defense civilians, and long-term students.

Table 2-1, Continued

Project Number	Description/Location	Type of Project (CIP/Hurricane Katrina Recovery/BRAC)	Construction (square feet)	Demolition (square feet)	Summary
General Area Development					
33	Replace Base Library	Hurricane Katrina Recovery	19,480	19,290	The existing library must be relocated to accommodate a new Base Exchange/ Commissary complex to replace existing facilities that was extensively damaged during the hurricane. The central library is required to support the base population, which includes permanent party personnel, Department of Defense civilians, large student populations, retirees, and family members. If the base library is not relocated, the Base Exchange/Commissary could not be constructed on higher ground out of the new proposed floodplain being recommended by the Federal Emergency Management Agency. Part of the Base Exchange/Commissary parking facilities would still be located in the 100-year floodplain.
34	Consolidated Club and Golf Course Club House	Hurricane Katrina Recovery	36,750	34,300	Replacement of the hurricane-damaged consolidated club and golf club house is required to support the personnel assigned to the installation and provide adequate quality of life facilities.
35	Replace Recreation Center	Hurricane Katrina Recovery	31,890	31,890	The existing recreation center must be relocated to accommodate the Base Exchange/Commissary complex. A recreation center is required to support the base population, which includes permanent party personnel, Department of Defense civilians, large student populations, retirees, and family members.

Table 2-1, Continued

Project Number	Description/Location	Type of Project (CIP/Hurricane Katrina Recovery/BRAC)	Construction (square feet)	Demolition (square feet)	Summary
General Area Development					
36	Recreational Vehicle Park and Construction Camp	Hurricane Katrina Recovery	4,000 (buildings) 980,000 (pavements)		The existing recreational vehicle area would be relocated to a Recreational Vehicle Park in to the Harrison Court area, which is located in the 100-year floodplain to provide the needed acreage for construction of Military Family Housing. The Recreational Vehicle Park would consist of concrete pads and roadways with a laundry facility. A Construction Camp consisting of concrete pads for the placement of temporary housing trailers and roadways would be included immediately adjacent to the recreational vehicle park. The Construction Camp would provide an area for temporary housing of construction workers for the Military Family Housing revitalization.
		Total	2,228,549 (buildings) 1,333,000 (pavements) 300,000 (fields)	2,230,139	

BRAC Base Realignment and Closure
CIP Capital Improvements Plan

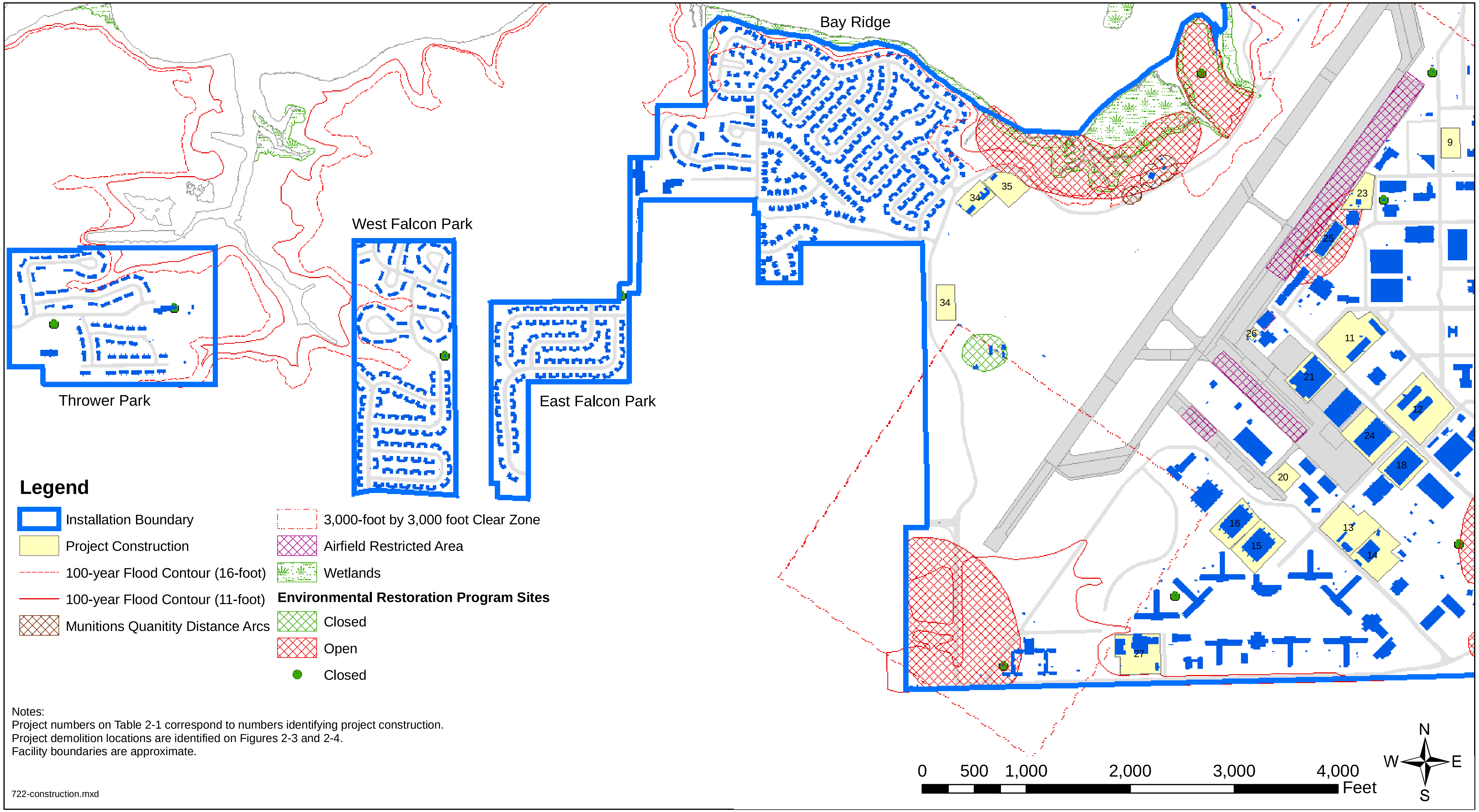

Figure 2-1 Locations of Proposed Action (Part 1 of 2), Keesler Air Force Base, Mississippi

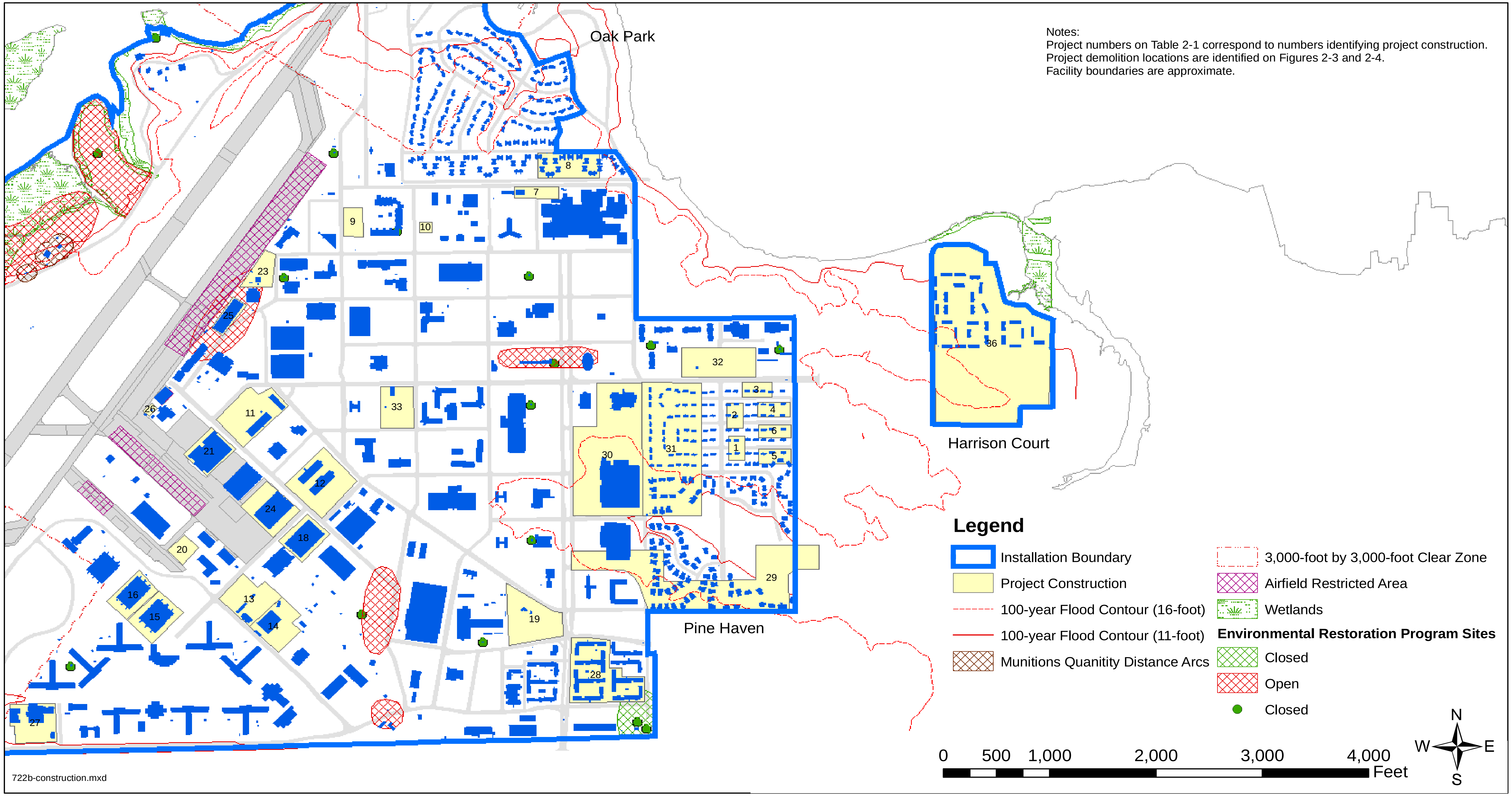

Figure 2-2 Locations of Proposed Action (Part 2 of 2), Keesler Air Force Base, Mississippi

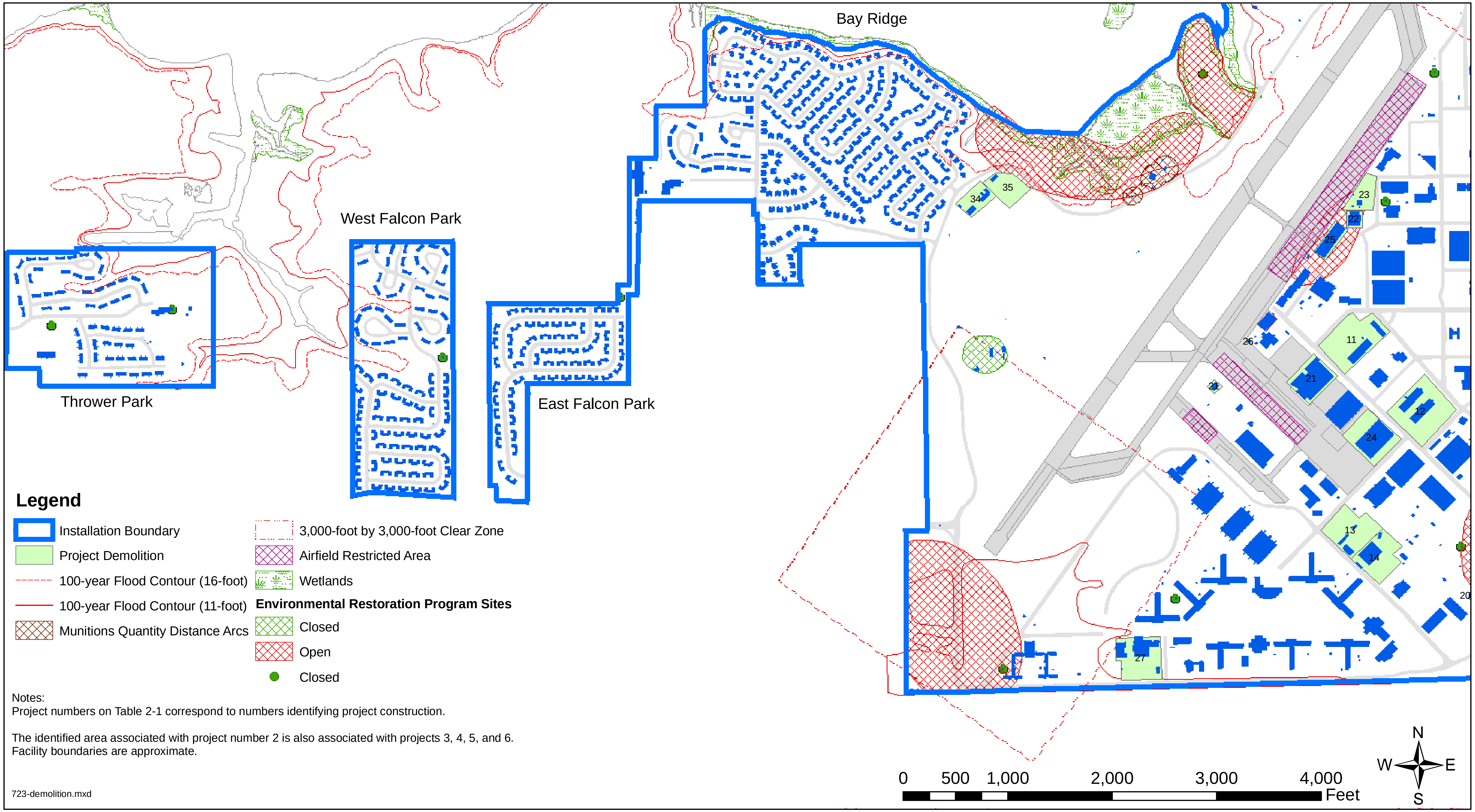

Figure 2-3 Locations of Demolition Associated with Proposed Action (Part 1 of 2), Keesler Air Force Base, Mississippi

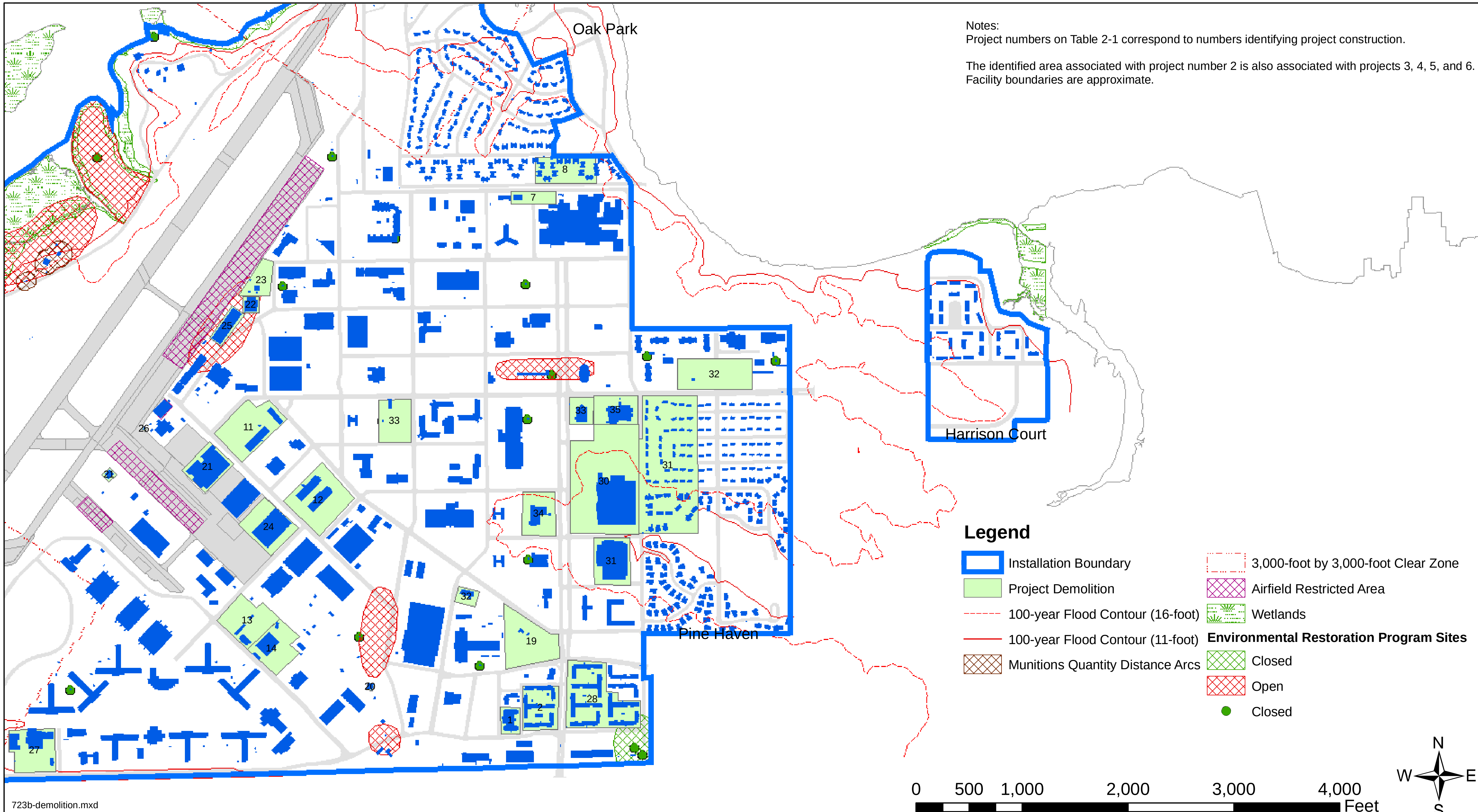

Figure 2-4 Locations of Demolition Associated with Proposed Action (Part 2 of 2), Keesler Air Force Base, Mississippi

2.6.1 Sustainable Population

Keesler AFB currently supports a baseline population of approximately 18,201 persons (including active duty military, resident military dependents, students, and civilian personnel). Based on an analysis of potential new facilities that include administrative, training, and housing structures (see Appendix B), it has been determined that the base has the potential to accommodate an additional population of 11,716: 5,360 working personnel (active duty military and civilian personnel), 4,522 students, 1,178 resident military dependents, and 656 visitors.

2.6.2 Development Potential

Twenty-six individual parcels totaling 131 acres of land available for development were identified based on analysis of existing and future land use plans and the elimination of parcels with associated building constraints (Figure 2-3). Table 2-2 identifies developable acreage per land use category.

Based on the current development ratios per land use category, the square footage of buildings and pavements that could be accommodated within these developable areas was estimated. The calculations in Appendix B demonstrate that Keesler AFB can accommodate an additional 4,040,886 square feet of new building space construction, and therefore can accommodate the proposed action construction projects, which total 2,228,549 square feet (see Section 2.5). The demolition of existing building space associated with implementing this construction is 2,518,378 square feet. This figure includes both the 2,230,139 square feet of demolition associated with the proposed action as well as an additional 288,239 square feet of existing building space from structures that will reach the end of their useful life within the planning period that ends in FY2013. Demolition of the housing areas will be addressed as a cumulative impact, because it was previously evaluated in the *Military Family Housing EA* (USAF 2006a). The net gain in building space would be 1,522,508 square feet, and the net gain in pavements would be 53.4 acres (including roadways, sidewalks, and parking areas). The net increase in impervious surfaces would be 85 acres[1], or 14 percent.

A portion of Keesler AFB is located within the 100-year floodplain. Under the alternative action, only the projects detailed in the proposed action would be located in the floodplain. These project sites will be fully evaluated in Section 4 of the document. No other developable parcels were identified in the floodplain at Keesler AFB.

[1] Note that building space typically includes multiple floors and does not add directly to pavements for total impervious surfaces. Impervious surfaces are calculated by finding the sum of the building footprints and the pavements surrounding them.

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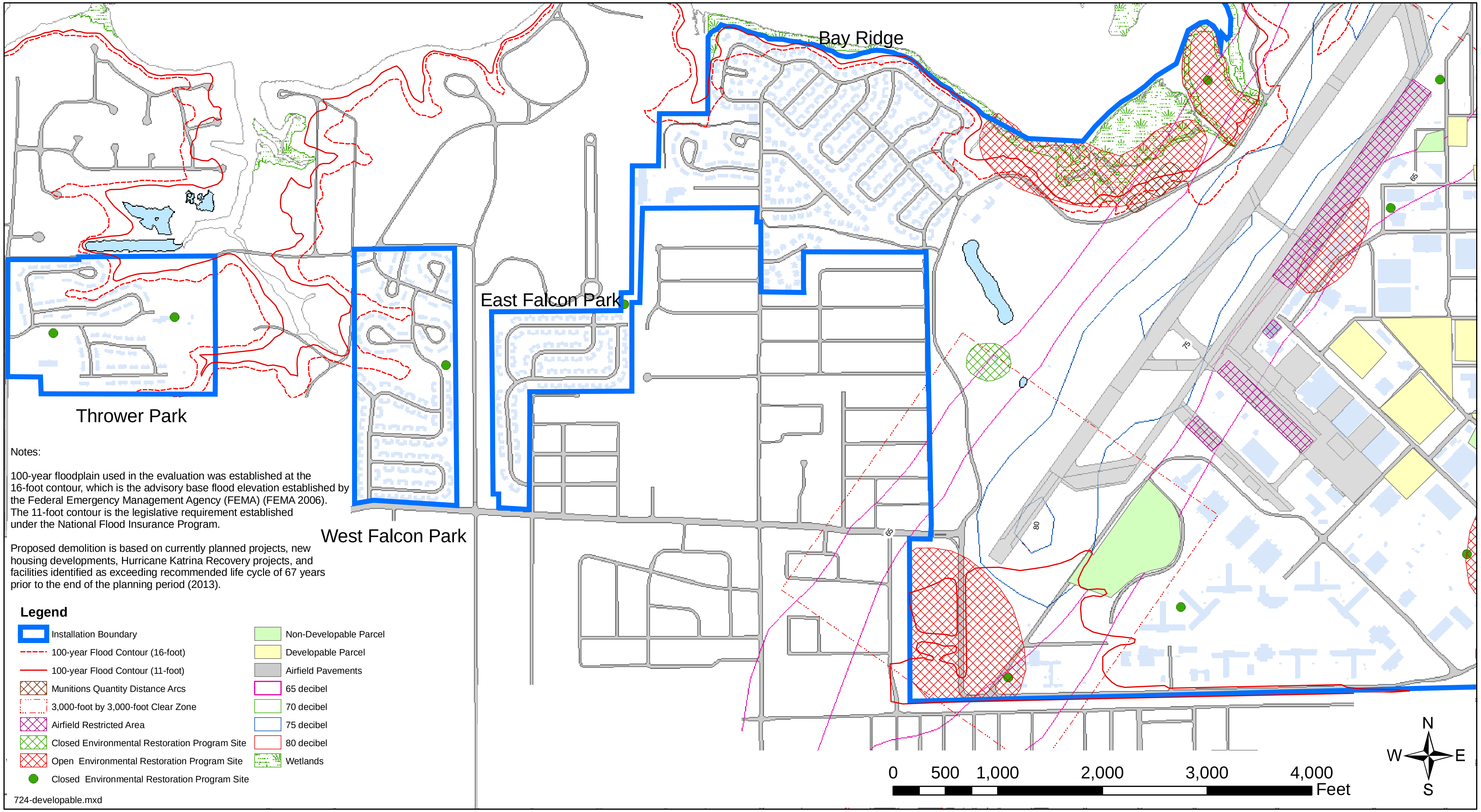

Figure 2-5 Potentially Developable Parcels (Part 1 of 2), Keesler Air Force Base, Mississippi

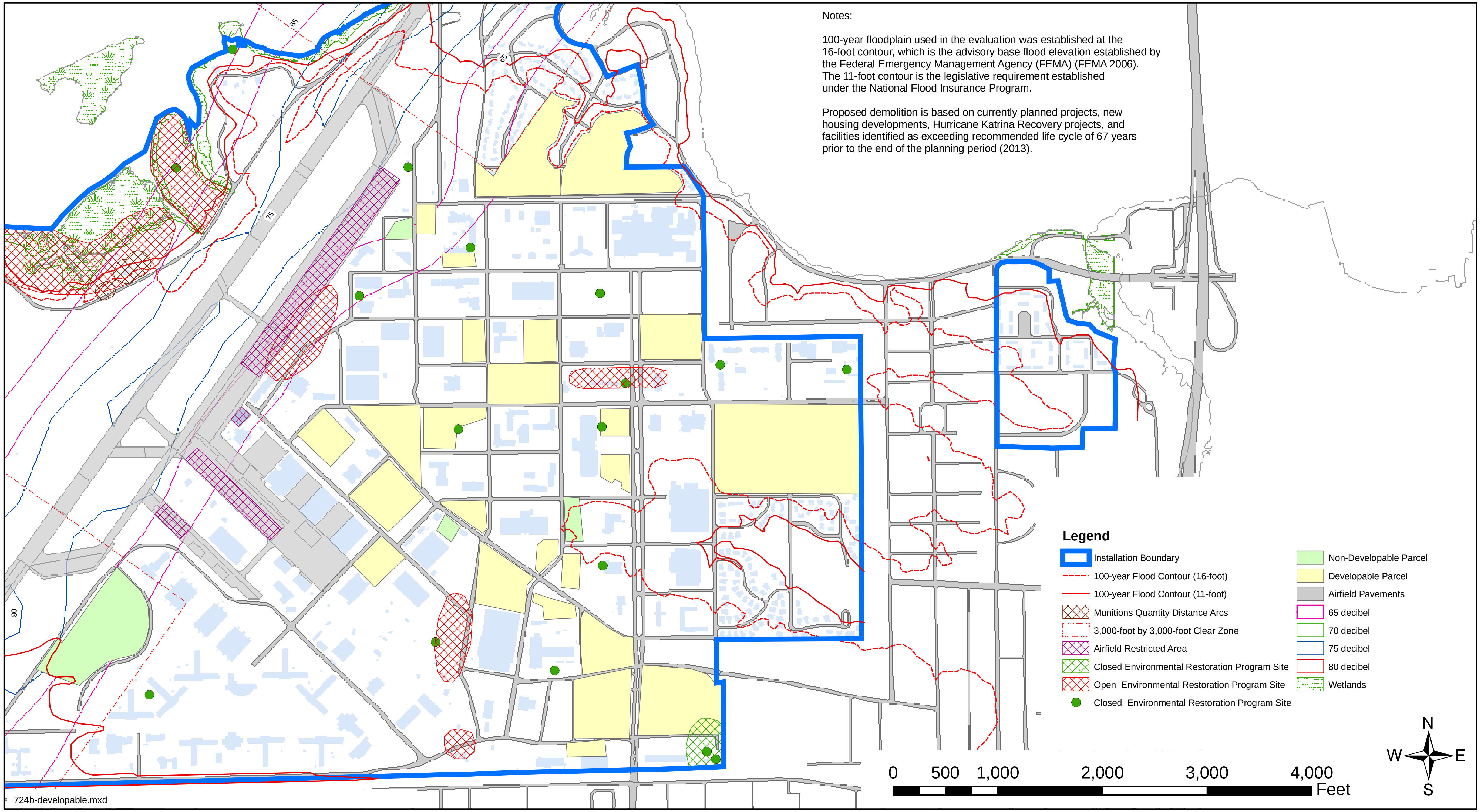

Figure 2-6 Potentially Developable Parcels (Part 2 of 2), Keesler Air Force Base, Mississippi

Table 2-2 Developable Acreage, Alternative Action

Air Force Land Use Category	Total (acres)	Undevelopable Parcel (acres)	Developable Parcel (acres)
Aircraft Operation and Maintenance	1.20	0.00	1.20
Administrative	6.46	0.00	6.46
Airfield	0.00	0.00	0.00
Airfield Pavements	0.00	0.00	0.00
Community Commercial	0.95	0.00	0.95
Community Services	0.99	0.00	0.99
Housing Accompanied	0.00	0.00	0.00
Housing Unaccompanied	40.95	0.05	40.90
Industrial	20.12	0.00	20.12
Medical	12.52	0.00	12.52
Open Space	28.69	0.92	27.77
Outdoor Recreation	13.77	13.75	0.02
Technical Training	22.35	2.23	20.12
Total	**148.00**	**16.95**	**131.05**

Source: Appendix B

2.6.3 Sustainable Flying Mission Levels

Keesler AFB currently supports approximately 36,400 aviation operations annually, or 146 operations daily. To assess the potential for the expansion of C-130J flight operations at Keesler AFB, C-130J flights were incrementally increased and the resulting noise contours evaluated (Appendix B). The resulting analysis identified a potential increase of a total of 42,000 annual or 168 daily operations at the installation. This represents a 15 percent increase in total current aircraft operations and a 60 percent increase in current C-130J flight operations (Appendix B).

2.7 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS IN THE REGION OF INFLUENCE

Cumulative impacts to environmental resources result from the incremental effects of proposed actions when combined with other past, present, and reasonably foreseeable future projects in the region of influence (ROI). Cumulative impacts can result from individually minor, but collectively substantial, actions undertaken over a period of time by various agencies (federal, state, or local) or individuals. In accordance with NEPA, a discussion of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the near future is required. Specific projects that have the potential to cumulatively impact the proposed action and alternative actions discussed in this EA are described in the sections below.

2.7.1 On-base Activities

The following list includes projects evaluated in other EAs but not completed prior to the end of the 2004 baseline year (USAF 2004a). Projects completed prior to the end of 2004 are included in the baseline and projects not completed prior to the end of 2004 are considered when evaluating cumulative impacts. The following are on-base projects that will be considered when evaluating cumulative impacts:

- Training Facility Phase 2: Construct a 165,000-square foot, three-story training facility for replacement of Hangars 1 and 2.
- AFRC Two-bay Hangar: Construct a new 52,700-square foot, two-bay hangar for C-130J aircraft.
- Student Dormitory Number (No.) 8: Construct a new 110,000-square foot 200-room student dormitory in Triangle Area. Demolish existing dorm 7202 (110,000 square feet of demolition).
- Student Mini Base Exchange: Construct 28,000-square foot mini-mall.
- Army and Air Force Exchange Service Shoppette and Car Center: Construct a new 20,100-square foot facility to include Shoppette, car repair center, food restaurant, and 12-dispenser gas station.
- Child Development Center Addition: Construct 14,000-square foot addition to existing facility. Includes six classrooms, an indoor playroom, service areas, and offices.
- AFRC C-130 Fuel Maintenance Facility: Construct a fuel cell maintenance hangar for C-130 aircraft (total of approximately 30,000 square feet).
- AFRC Aircraft Rinse Facility: Construct aircraft rinse facility on Taxiway C (total of approximately 20,000 square feet).
- Demolition of Cody Hall, Facility 4202: This project includes 139,000 square feet of demolition.
- Demolition of Harrison Court Area: This project includes 175,000 square feet of demolition.
- Demolition of Defense Reutilization and Marketing Office (DRMO) Facilities 4422 and 4423: This project includes 49,400 square feet of demolition.
- Demolition of Triangle Dormitory, Facility 7502: This project includes 106,500 square feet of demolition.
- Remove Base Supply Addition: Demolish 62,000 square feet of facilities.
- Student Dormitory No. 9: Construct a new 136,000-square foot 250-room student dormitory in Triangle Area. Project will demolish existing dorm 7502 and DRMO facilities.

- Small Arms Firing Range: Construct a 27,000-square foot indoor firing range, including classrooms, administration, range, storage, weapons cleaning area, bathrooms, a mechanical room, utilities, fire protection, and bullet catch systems.
- Base Supply Addition: Construct a new 63,000-square foot addition to the Base Supply.
- Services/Furniture Management Office (SV/FMO) Warehouse: Construct a 40,000-square foot SV/FMO warehouse, including areas for dormitory furniture storage, lodging operations and services general storage, restrooms, office space, and a mechanical room.
- Visiting Quarters: Construct a four-story, 320-room, 127,800-square foot facility, and a five-story, 100-room, 44,800-square foot facility to include laundries, lobby, and housekeeping areas.
- Student Dormitory No. 10: Construct a new 136,000-square foot 250-room student dormitory in Triangle Area.
- Fire/Crash Rescue Station: Construct a new 39,000-square foot fire/crash rescue station with 10 drive-through bays. Project will demolish existing facility.
- Revitalization of Military Family Housing: Project will include 3,915,391 square feet of construction and 4,315,712 square feet of associated demolition.

Construction associated with these projects (which are taken into consideration when evaluating cumulative effects) totals 4,923,991 square feet, and the associated demolition totals 4,847,612 square feet.

2.7.2 Off-base Activities

2.7.2.1 Mississippi Department of Transportation Construction

Due to traffic congestion on US Highway 90, the main east-west arterial on the Biloxi Peninsula, the Mississippi State Highway Department (MDOT) is evaluating options for providing an additional connection between IH-10 and US Highway 90. The Federal Highway Administration has approved the development of an EIS for this project and the EIS is currently underway. The preferred route for the connection follows the western boundary of the West Falcon Housing area. Proposed interchanges for the new north-south highway are at US Highway 90, Pass Road, and Popps Ferry Road.

The MDOT is also evaluating the Bay St. Louis and Biloxi-Ocean Springs bridges (both located along US Highway 90), which were damaged in the wake of Hurricane Katrina. Both bridge replacement projects would build new high-rise bridges at each location as well as partially or fully replace bridges immediately nearby. The MDOT will perform an EA for the Biloxi-Ocean Springs Bridge replacement because it would have more lanes than the destroyed bridge. More information can be found at http://www.gomdot.com (MDOT 2006).

2.7.2.2 Regional Hurricane Katrina Recovery

The entire Mississippi Gulf Coast is currently involved in a massive regional recovery effort from Hurricane Katrina. The City of Biloxi estimates that more than one-fifth (more than 5,000) of the city's structures (including housing) were destroyed by the hurricane, and that many others experienced damage. Many of the city's roadways and bridges were damaged or destroyed; many still have only limited access (City of Biloxi 2006a).

The City of Biloxi is currently in the process of restoring damaged buildings, roadways, and bridges, and rebuilding new structures, as is the rest of the Gulf Coast. The list of specific recovery efforts in and around the region is extensive. More information can be found at the City of Biloxi's website (http://www.biloxi.ms.us) and at the Governor of Mississippi's Commission on Recovery, Rebuilding, and Renewal's website (http://www.mississippirenewal.com). Most recovery efforts would involve some degree of demolition and construction of structures and infrastructure.

2.8 COMPARISON MATRIX OF ENVIRONMENTAL EFFECTS OF ALL ALTERNATIVES

Table 2-3 summarizes the impacts of the proposed and alternative actions. The impacts for the no action alternative are the same as baseline conditions.

Table 2-3 Summary of Environmental Effects

Resource	No Action Alternative	Proposed Action	Alternative Action
Noise	Same as baseline conditions presented in Section 3.3.1.2. Cumulative impacts to sensitive receptors for the no action alternative and ongoing actions would not occur.	Because the construction activities necessary to recover from the damage sustained as a result of Hurricane Katrina are situated within areas already exposed to elevated noise from airfield operations, they would not be expected to create adverse impacts, or alter noise contours associated with aircraft operations. Since construction-related noise is intermittent and transitory, and ceases at the completion of construction, the long-term acoustic environment on Keesler AFB would not be expected to be impacted by construction activities. Noise associated with aircraft operations would be the same as baseline conditions presented in Section 3.3.1.2. Cumulative impacts to sensitive receptors for the proposed action and ongoing actions are expected to be minimal in the context of the overall recovery and reconstitution of Biloxi, Mississippi from Hurricane Katrina, because these projects are dispersed throughout the region and are not atypical sources of noise in the community.	The effects of construction activities would be the same as for the proposed action. Approximately 204.14 acres of land exposed to elevated noise levels (noise levels that exceed 65 A-weighted decibels) at Keesler AFB would be added under the alternative action. This increase is not expected to be significant, because land use under the expanded noise contours would not be affected. Cumulative impacts to sensitive receptors for the alternative action and ongoing actions are expected to be minimal in the context of the overall recovery and reconstitution of Biloxi, Mississippi from Hurricane Katrina because these projects are dispersed throughout the region and are not atypical sources of noise in the community.
Aircraft Management and Air Traffic Control	Same as baseline conditions presented in Section 3.3.2. Cumulative impacts to sensitive receptors for the no action alternative and ongoing actions would not occur.	Under the proposed action, no modifications or changes to unit flight activities from current operations would occur. No adverse impacts to the airspace around Keesler AFB or the existing Air Traffic Control Area systems would be anticipated. Cumulative impacts to aircraft management and air traffic control would not be expected.	The airfield and airspace assets under the alternative action would be physically able to accommodate the increased number of C-130 operations. The alternative action is not expected to appreciably contribute to cumulative impacts from other ongoing activities to aircraft management and air traffic control.

Table 2-3, Continued

Resource	No Action Alternative	Proposed Action	Alternative Action
Land Use	Same as baseline conditions presented in Section 3.3.3. Cumulative impacts to land use for the no action alternative and ongoing actions would not occur.	The proposed action would be consistent with land use concepts defined for the installation by base planners. Cumulative impacts to land use would not be expected.	Approximately 204 acres of land exposed to elevated noise levels (noise levels that exceed 65 A-weighted decibels) at Keesler AFB would be added under the alternative action. There are no areas in sensitive land use categories underlying these contours. Cumulative impacts to land use would not be expected.
Earth Resources	Same as baseline conditions presented in Section 3.3.4. Cumulative impacts to earth resources from the no action alternative and ongoing actions are not expected.	Soil disturbance impacts would be minimized through observance of National Pollutant Discharge Elimination System and Stormwater Pollution Prevention Plan requirements. The amount of disturbed land would be approximately 76 acres with impervious cover increasing by approximately 28 acres. Cumulative impacts to earth resources are expected to be minor; within the context of the Hurricane Katrina recovery effort, the proposed action is not expected to appreciably contribute to cumulative impacts associated with earth resources.	Soil disturbance impacts would be minimized through observance of National Pollutant Discharge Elimination System and Stormwater Pollution Prevention Plan requirements. The amount of disturbed land would be approximately 112 acres with impervious cover increasing by approximately 85 acres Cumulative impacts to earth resources are expected to be minor; within the context of the Hurricane Katrina recovery effort, the alternative action is not expected to appreciably contribute to cumulative impacts associated with earth resources.
Water Resources	Same as baseline conditions presented in Section 3.3.5. Cumulative impacts to water resources from the no action alternative and ongoing actions are not expected.	The construction of the proposed action facilities would increase total impervious cover by 4.6 percent. This is expected to have a minimal impact on the total volume of stormwater runoff (an estimated 2.1 percent). Minor adverse effects would be expected by construction of three proposed action projects in the 100-year floodplain. The construction associated with the proposed action is expected to cumulatively increase surface cover, but only minor adverse effects would be expected.	The construction of the alternative action would increase total impervious cover by approximately 14 percent. This is expected to have a minor impact on the total volume of stormwater runoff (an estimated 6 percent). Impacts to the 100-year floodplain would be the similar to those described for the proposed action. The construction associated with the alternative and ongoing actions is expected to cumulatively increase surface cover, but only minor adverse effects would be expected.

Table 2-3, Continued

Resource	No Action Alternative	Proposed Action	Alternative Action
Hazardous Materials and Waste	Same as baseline conditions presented in Section 3.3.6. Cumulative impacts to hazardous materials and hazardous waste are not expected from the no action alternative and ongoing actions.	Hazardous materials consumption and hazardous waste generation would increase under the proposed action. Increased regulation would not occur. Lead-based paint and asbestos, if encountered, would be managed and disposed of according to existing plans and procedures. Cumulative impacts to hazardous materials, hazardous waste, asbestos, and lead-based paint are not expected from the proposed action and ongoing actions.	Hazardous materials consumption and hazardous waste generation would increase under the alternative action. Increased regulation would not occur. Lead-based paint and asbestos, if encountered, would be managed and disposed of according to existing plans and procedures. Cumulative impacts to hazardous materials, hazardous waste, asbestos, and lead-based paint are not expected from the alternative action and ongoing actions.
Biological Resources	Same as baseline conditions presented in Section 3.3.7. Cumulative impacts to biological resources from the no action alternative and ongoing actions are not expected.	No measurable impacts to vegetative or wildlife resources would occur. The proposed action would have no impact on federal and state listed endangered and threatened species because they are not known to occur on Keesler AFB. Construction activities associated with the proposed action would not occur in wetland areas. The proposed action and ongoing actions would not have incremental effects on the vegetation and wildlife of Keesler AFB or the local area.	Same as for the proposed action. The alternative action and ongoing actions would not have incremental effects on the vegetation and wildlife of Keesler AFB or the local area.

Table 2-3, Continued

Resource	No Action Alternative	Proposed Action	Alternative Action
Utilities and Infrastructure	Same as baseline conditions presented in Section 3.3.8. Cumulative impacts to infrastructure and utilities from the no action alternative and ongoing actions are not expected.	The quantity of wastewater generated and potable water consumed would increase negligibly, and electricity and natural gas demand would increase by approximately 1.5 percent. A one-time generation of approximately 198,053 tons of solid waste would result from construction and demolition activities. No additional personnel are proposed to be added to Keesler AFB; therefore, no additional traffic would be created and conditions would remain close to the current baseline. Impervious cover at Keesler AFB would increase by 28 acres. Cumulative impacts to infrastructure and utilities are not expected from implementation of the proposed and ongoing actions, with the exception of transportation. Cumulative impacts to transportation as a result of the proposed action in combination with other projects in the Biloxi area would be expected to be positive over the long-term because they would enhance the flow of traffic on, to, and off the base.	The quantity of wastewater generated would increase by approximately 64 percent, potable water consumption would increase by approximately 64 percent, and electricity and natural gas demand would increase by approximately 12.5 percent. A one-time generation of 227,125 tons of solid waste would result from construction and demolition activities. Minor impacts to daily traffic would be expected as a result of the alternative action. Impervious cover at Keesler AFB would increase by 85 acres. Cumulative impacts to infrastructure and utilities are not expected from implementation of the alternative and ongoing actions, with the exception of transportation. Cumulative impacts to transportation as a result of the alternative action in combination with other projects in the Biloxi area would be expected to be positive over the long-term because they would enhance the flow of traffic on, to, and off the base.
Socioeconomics	Same as baseline conditions presented in Section 3.3.9. Cumulative impacts to socioeconomics resulting from the no action alternative and ongoing actions are not expected.	Personnel levels at Keesler AFB are not expected to change under the proposed action; therefore, no effects to regional demographics are anticipated. Demand for housing and relative community services would be unaffected. The proposed action and ongoing actions would have minor incremental effects on the socioeconomics of Keesler AFB and the local area.	Implementation of the alternative action would add to the redevelopment stress already experienced in the area in the aftermath of Hurricane Katrina. However, the potential influx of military personnel and their families, in an area already accustomed to a strong military presence, could bolster local and regional revitalization efforts. The alternative action and ongoing actions would have minor incremental effects on the socioeconomics of Keesler AFB and the local area.

Table 2-3, Continued

Resource	No Action Alternative	Proposed Action	Alternative Action
Air Quality	Same as baseline conditions presented in Section 3.3.10. The cumulative emissions of all pollutants would be less than 250 tpy for all AQCRs; therefore, the no action alternative would not impact air quality.	The emissions of all pollutants would be well below the 10 percent criterion for each pollutant in comparison to Harrison County's year 2002 National Emissions Inventory, a more restrictive criterion than required by the General Conformity Rule; therefore, the proposed action and ongoing actions would not impact air quality. The proposed action and ongoing actions would have minor incremental effects on the air quality of Keesler AFB and the local area and would be well below the 10 percent criterion for each pollutant in comparison to Harrison County's year 2002 National Emissions Inventory, more restrictive criterion than required by the General Conformity Rule.	The emissions of all pollutants would be well below the 10 percent criterion for each pollutant in comparison to Harrison County's year 2002 National Emissions Inventory, a more restrictive criterion than required by the General Conformity Rule; therefore, the alternative action and ongoing actions would not impact air quality. The alternative action and ongoing actions would have minor incremental effects on the air quality of Keesler AFB and the local area and would be well below the 10 percent criterion for each pollutant in comparison to Harrison County's year 2002 National Emissions Inventory, more restrictive criterion than required by the General Conformity Rule.
Cultural Resources	Same as for baseline conditions as presented in Section 3.3.11. Cumulative impacts to cultural resources are not expected from the no action alternative and ongoing actions.	Sites for planned facilities have been previously disturbed. No archaeological resources have been identified at Keesler AFB. Hanger 0228 is the only historic architectural resource identified on the base and is part of the proposed action. A Memorandum of Agreement was reached between Keesler AFB and the Mississippi Department of Archives and History, with acceptable by the Advisory Council on Historic Preservation allowing for the demolition of Hanger 0228. The Mississippi Department of Archives and History State Historic Preservation Officer were informed of all the proposed projects to solicit input regarding historical and archaeological resources. No properties listed in or eligible for listing in the National Register of Historic Places would be affected under the proposed action.	Same as for the proposed action. The alternative and ongoing actions would not have incremental effects on the cultural resources in or around Keesler AFB.

AFB Air Force Base AQCR Air Quality Control Region tpy tons per year

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Chapter 3

Affected Environment

CHAPTER 3

AFFECTED ENVIRONMENT

The affected environment is the baseline against which potential impacts caused by the proposed action and alternative actions (including the no action alternative) are assessed. This chapter focuses on the human environment that has the potential to be affected by the proposed implementation of the Hurricane Katrina Recovery projects, construction to accomplish the CIP projects, BRAC program projects related to Keesler AFB, and demolition of facilities that are either dilapidated or in the footprint of the proposed construction projects. As stated in 40 CFR §1508.14, the potentially affected human environment is interpreted comprehensively to include natural and physical resources and the relationship of people with the resources. The environmental baseline was defined by first identifying potential issues and concerns related to the proposed action, as discussed in Section 1.3. From this information, the relevant natural and physical resources were selected for description in this chapter.

3.1 INTRODUCTION

This chapter provides baseline data describing the man-made and natural environmental elements with the potential to be affected by the implementation of the proposed action or alternative action at Keesler AFB. Information is presented in this section to the level of detail necessary to support the analysis of potential impacts in Chapter 4, Environmental Consequences.

3.2 INSTALLATION HISTORY AND CURRENT MISSION

Keesler AFB was activated in June 1941 as a training center for B-24 Liberator aircraft mechanics. The site was used as a small public airfield before it was acquired by the Air Force. After World War II, Keesler AFB was designated a permanent military base. Electronics, communications, personnel, and pilot training programs were later added to the existing mechanics training programs. In 1947, the radar training school was transferred to Keesler AFB from Boca Raton, Florida. Communications and control courses were transferred to the base from Scott AFB, Illinois, in 1958. Personnel were transferred from Amarillo, Texas, to Keesler AFB in 1968. In 1967, the Air Force Pilot Training School was activated at the base. The pilot training program used T-28 aircraft and operated from 1967 until 1973. Today new recruits and prior service students receive training at Keesler AFB in fields such as maintenance, radio and radar systems maintenance, communications electronics, computer systems programming and maintenance, and air traffic control. Host to the second largest Air Force medical treatment facility in the US, the Keesler Medical Center is an approximately 50-bed teaching hospital for Air Force doctors, nurses, and medical technicians, with 62 outpatient clinics, a clinical research laboratory, and aero medical facilities. The flying mission at

Keesler consists of the 403rd Wing, parent unit of the famous "Hurricane Hunters," responsible for all weather reconnaissance missions flown for the Department of Defense (DoD) during peacetime.

Keesler AFB is home to the 81 TRW, one of the largest technical training wings in AETC. The primary mission of the 81 TRW is to provide technical training for both active duty and reserve officers and airmen. The 81 TRW is composed of a training group, a support logistics group, and a medical group. Missions at Keesler AFB include:

- 403rd Wing. The AFRC 403rd Wing provides command and staff supervision and certain support functions for assigned units that provide tactical airlift support for airborne forces and airlift personnel, equipment, and supplies. The 403rd Wing also organizes and trains weather reconnaissance missions utilizing C-130 aircraft specially equipped with weather gathering instrumentation.

- 53rd Weather Reconnaissance Squadron (53 WRS). The 53 WRS is also known as the Hurricane Hunters. This AFRC unit is solely responsible for investigating tropical systems that may pose a threat to the US and its territories. The 53 WRS operates ten WC-130J aircraft.

- 815th Airlift Squadron (815 AS). The 815 AS is known as the Flying Jennies. This AFRC unit provides tactical airlift support for airborne forces and personnel, equipment, and supplies. The 815 AS operates eight C-130J aircraft.

- 85th Engineering Installation Squadron (85 EIS). The 85 EIS is responsible for the engineering and installation of base communication systems for the Air Force and other government agencies worldwide.

- 57th Aeromedical Evacuation Squadron Detachment. The 57th Aeromedical Evacuation Squadron provides ground support for the Aeromedical Evacuation Center at Scott AFB and the 81st Medical Group.

- 81st Medical Group. This group is composed of the Medical Operations, Medical Support, Aerospace Medicine, and Dental squadrons that provide medical care to nearly 54,000 beneficiaries in the local area. Keesler AFB currently hosts the second largest medical group in the Air Force.

- 45th Airlift Squadron (45 AS). The 45 AS conducts formal training for initial pilot qualification, instructor upgrade, and Senior Officer Qualification in the C-21A aircraft. The 45 AS also conducts initial and upgrade training for C-12 and C-21 aircrews.

3.3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.3.1 Noise

3.3.1.1 Definition of the Resource

Noise is considered unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. It may be intermittent or continuous, steady or impulsive. It may be stationary or transient. Stationary sources are normally related to specific land uses, e.g., housing tracts or industrial plants. Transient noise sources move through the environment, either along relatively established paths (e.g., highways, railroads, and aircraft flight tracks around airfields and airports), or randomly. There is wide diversity in responses to noise that not only vary according to the type of noise and the characteristics of the sound source, but also according to the sensitivity and expectations of the receptor, the time of day, and the distance between the noise source (e.g., an aircraft) and the receptor (e.g., a person or animal).

The physical characteristics of noise (or sound) include its intensity, frequency, and duration. Sound is created by acoustic energy, which produces minute pressure waves that travel through a medium, like air, and are sensed by the eardrum. This may be likened to the ripples in water that would be produced when a stone is dropped into it. As the acoustic energy increases, the intensity or amplitude of these pressure waves increases, and the ear senses louder noise. The unit used to measure the intensity of sound is the decibel (dB). Sound intensity varies widely (from a soft whisper to the sound of a jet engine) and is measured on a logarithmic scale to accommodate this wide range. The logarithm, and its use, is nothing more than a mathematical tool that simplifies dealing with very large and very small numbers. For example, the logarithm of the number 1,000,000 is 6, and the logarithm of the number 0.000001 is -6 (minus 6). Obviously, as more zeros are added before or after the decimal point, converting these numbers to their logarithms greatly simplifies calculations that use these numbers.

The frequency of sound is measured in cycles per second, or hertz (Hz). This measurement reflects the number of times per second the air vibrates from the acoustic energy. Low frequency sounds are heard as rumbles or roars, and high frequency sounds are heard as screeches. Sound measurement is further refined through the use of "A-weighting." The normal human ear can detect sounds that range in frequency from approximately 20 Hz to 15,000 Hz. However, not all sounds throughout this range are heard equally well. Because the human ear is most sensitive to frequencies in the 1,000 to 4,000 Hz range, some sound meters are calibrated to emphasize frequencies in this range. Sounds measured with these instruments are termed "A-weighted," and are indicated in terms of A-weighted decibels (dBA).

The duration of a noise event and the number of times noise events occur are also important considerations in assessing noise impacts. As a basis for comparison when considering noise levels, it is useful to note that at distances of about 3 feet, noise from normal human speech ranges from 63 to 65 dB, operating kitchen appliances range from about 83 to 88 dB, and rock bands approach 110 dB.

The word "metric" is used to describe a standard of measurement. Many different types of noise metrics have been developed by researchers attempting to represent the effects of environmental noise. Each metric used in environmental noise analysis has a different physical meaning or interpretation.

The metrics supporting the assessment of noise from aircraft operations around Keesler AFB and construction activities associated with the proposed action and alternative action assessed in this document are the maximum sound level (L_{max}), the sound exposure level (SEL), and Time-Averaged Sound Levels. Each metric represents a "tier" for quantifying the noise environment, and is briefly discussed below.

Maximum Sound Level. The L_{max} metric defines peak noise levels. L_{max} is the highest sound level measured during a single noise event (e.g., an aircraft overflight), and is the sound actually heard by a person on the ground. For an observer, the noise level starts at the ambient noise level, rises up to the maximum level as the aircraft flies closest to the observer, and returns to the ambient level as the aircraft recedes into the distance. Maximum sound level is important in judging a noise event's interference with conversation, sleep, or other common activities.

This document considers noise from aircraft operating around airfields. Around airfields, the primary operational modes of aircraft are departures (take-offs) and arrivals (landings). Table 3-1 shows L_{max} values at various distances associated with typical military aircraft operating at Keesler AFB.

Table 3-1 Representative Maximum Sound Levels

Aircraft/Type Power	L_{max} Values (in dBA) at Varying Distances (in feet) 500	1,000	2,000	5,000	10,000
Take-off/Departure Operations					
C-130E	90.6	83.7	76.3	65.4	56.0
C-130H	91.5	84.6	77.2	66.3	56.9
C-130J	91.5	84.4	76.8	65.4	56.0
Landing/Arrival Operations					
C-130E	89.3	82.1	74.3	62.4	52.2
C-130H	90.2	83.0	75.2	63.3	53.1
C-130J	90.8	83.6	75.8	64.1	54.3

L_{max} maximum sound level dBA A-weighted decibel

Source: OMEGA108

Sound Exposure Level. L_{max} alone may not represent how intrusive an aircraft noise event is because it does not consider the length of time that the noise persists. The SEL metric combines intensity and duration into a single measure. It is important to note, however, that SEL does not directly represent the sound level heard at any given time, but rather provides a measure of the total exposure of the entire event. Its value represents all of the acoustic energy associated with the event, as though it was present for one second. Therefore, for sound events that last longer than one second, the SEL value will be higher than the L_{max} value. The SEL value is important because it is the value used to calculate other time-averaged noise metrics. Table 3-2 shows SEL values that correspond to the aircraft and power settings depicted in Table 3-1.

Table 3-2 Representative Sound Exposure Levels

Aircraft/Type Power	SEL Values (in dBA) at Varying Distances (in feet) 500	1,000	2,000	5,000	10,000
Take-off/Departure Operations					
C-130E	95.6	90.5	84.9	76.4	68.8
C-130H	96.5	91.4	85.8	77.3	69.7
C-130J	97.8	92.5	86.6	77.6	70.1
Landing/Arrival Operations					
C-130E	93.6	88.2	82.1	72.7	64.3
C-130H	94.5	89.1	83.0	73.6	65.2
C-130J	95.3	90.0	84.0	74.7	66.7

SEL sound exposure level dBA A-weighted decibel

Source: OMEGA108

Time-Averaged Cumulative Noise Metrics. The number of times noise events occur during given periods is also an important consideration in assessing noise impacts. The "cumulative" noise metrics that support the analysis of multiple time-varying noise events are the Day-Night Average Sound Level (L_{dn}), and the equivalent noise level (L_{eq}).

Day-Night Average Sound Level. This metric sums the individual noise events and averages the resulting level over a specified length of time. It is a composite metric that considers the maximum noise levels, the duration of the events, the number of events that occur, and the time of day during which they occur. This metric adds 10 dB to those events that occur between 10:00 p.m. and 7:00 a.m. to account for the increased intrusiveness of noise events that occur at night (when ambient noise levels are normally lower than during the daytime). This cumulative metric does not represent the variations in the sound level heard. Nevertheless, it does provide an excellent measure for comparing environmental noise exposures when there are multiple noise events to be considered.

Equivalent Noise Level. This metric also sums all individual noise events and averages them over a specified time period. Common averaging times are 8- and 24-hour periods [$L_{eq(8)}$ and $L_{eq(24)}$]. This metric assigns no penalty for the time at which the noise event occurs. Therefore, if no noise events occur at night, calculations of L_{dn} and L_{eq} would be identical.

Finally, it should be noted that ambient background noise is not considered in the noise calculations presented in this document. There are two reasons for this. First, ambient background noise, even in wilderness areas, varies widely, depending on location and other conditions. For example, studies conducted in an open pine forest in the Sierra National Forest in California have measured up to a 10 dBA variance in sound levels simply due to an increase in wind velocity (Harrison 1973). Therefore, assigning a value to background noise would be arbitrary. Secondly, and probably most important, it is reasonable to assume that ambient background noise in the project's ROI would have little or no effect on the calculated L_{dn}. In calculating noise levels, louder sounds dominate the calculations, and overall, aircraft and other transportation-related noise would be expected to be the dominant noise sources characterizing the acoustic conditions in the region.

Using measured sound levels as a basis, the USAF developed several computer programs to calculate noise levels resulting from aircraft operations. Sound levels calculated by these programs have been extensively validated against measured data, and have been proven highly accurate.

In this document, the sound levels calculated for aircraft operations in the airfield environment are all presented in terms of daily L_{dn}. L_{dn} metrics are the preferred noise metrics of the Department of Housing and Urban Development, the Department of Transportation, the Federal Aviation Administration, the United States Environmental Protection Agency (USEPA), and the Department of Veterans Affairs (VA).

Ignoring the nighttime penalty for the moment, L_{dn} may be thought of as the continuous or cumulative A-weighted sound level that would be present if all variations in sound level that occur over the given period were smoothed out so as to contain the same total sound energy. While L_{dn} does provide a single measure of overall noise impact, it is fully recognized that it does not provide specific information about the number of noise events or the specific individual sound levels that occur. For example, an L_{dn} of 65 dB could result from very few noisy events, or a large number of quieter events. Although it does not represent the sound level heard at any one particular time, it does represent the total sound exposure. Scientific studies and social surveys have found the L_{dn} metric to be the best measure to assess levels of community annoyance associated with all types of environmental noise. Therefore, its use is endorsed by the scientific community and governmental agencies (American National Standards Institute 1980 and 1988, USEPA 1974, Federal Interagency Committee on Urban Noise 1980, Federal Interagency Committee on Noise 1992).

The ROI for the noise assessments is the area around Keesler AFB exposed to elevated noise levels caused by aviation-related noise and other human activities in the region.

3.3.1.2 Existing Conditions

Public annoyance is the most common concern associated with exposure to elevated noise levels. When subjected to L_{dn} levels of 65 dBA, approximately 12 percent of the persons so exposed will be "highly annoyed" by the noise. At levels below 55 dBA, the percentage of annoyance is significantly lower (less than three percent), and at levels above

70 dBA, it is significantly higher (greater than 25 percent) (Finegold et al. 1994). Table 3-3 shows the percentage of the population expected to be highly annoyed at a range of noise levels.

During the last 12 months, the 81 TW has received three noise complaints. In previous years, noise complaints have averaged approximately five to six per year (Taranto 2006).

Table 3-3 Percentage of Population Highly Annoyed by Elevated Noise Levels

Noise Exposure (L_{dn} in dBA)	Percent Highly Annoyed
< 65	< 12
65 – 70	12 – 21
70 – 75	22 – 36
75 – 80	37 – 53
80 – 85	54 – 70
> 85	> 71

L_{dn} Day-Night Average Sound Level dBA A-weighted decibel

Source: Finegold, et al. 1994

3.3.1.3 Aircraft Activity at Keesler AFB

The following terms are defined to provide a better understanding of how data are developed for input to the various noise models used to calculate noise.

Around an airfield, aircraft operations are categorized as take-offs, landings, or closed patterns (which could include activities referred to as touch-and-gos or low approaches). Each take-off or landing constitutes one operation. A closed pattern occurs when the pilot of the aircraft approaches the runway as though planning to land, but then applies power to the aircraft and continues to fly as though taking off again. The pilot then flies a circular or rectangular track around the airfield, and again approaches for landing. In some cases, the pilot may actually land on the runway before applying power, or in other cases, the pilot simply approaches very close to the ground. In either event, although a closed pattern is entered into the noise model as a single event, because the operation essentially consists of a landing and a take-off, it is considered two operations.

Aviation facilities at Keesler AFB include one Class B runway, taxiways, parking ramp areas, and associated landside facilities. Runway 03/21 is 7,630 feet long by 150 feet wide. Runway 03 has a 1,598-foot displaced threshold; Runway 21 has a 1,000-foot displaced threshold. Controlled airspace has been established in the region to manage air traffic.

Under current conditions, Keesler AFB supports approximately 36,400 annual aviation operations. This equates to approximately 146 daily operations. Considering all types of flight activities, a scenario representing an "average day's" operations was developed. The operations considered include arrivals (landings), departures (take-offs), and closed patterns. Noise calculations consider the frequency of flight operations, runway utilization, and the flight tracks and flight profiles flown by each aircraft. The numbers and types of representative operations considered are shown in Table 3-4.

Table 3-4 Average Daily Operations at Keesler AFB

Aircraft	Arrivals		Departures		Closed Patterns		Totals
	Day	Night	Day	Night	Day	Night	
Based C-130	5.344	0.083	5.445	0	26.028	0	36.900
Based C-12	6.856	0	6.856	0	49.884	0	63.596
Based C-21	9.138	0	9.136	0	8.284	0	26.558
Rotary Wing	1.235	0	1.236	0	0	0	2.470
Transient	4.920	0.121	4.918	0.121	5.488	0	15.568
Civil	0.300	0	0.300	0	0	0	0.600
Total	**27.773**	**0.204**	**27.871**	**0.121**	**89.684**	**0**	**145.653**

Note: Daily operations are based on averages of annual operations; therefore, numbers do not round.

Source: USAF 2006b

These levels and types of activity are then combined with information on climatology, maintenance activities, and aircraft flight parameters, and processed through the USAF's BASEOPS/NOISEMAP (Moulton 1990) computer models to calculate L_{dn}. Once noise levels are calculated, they are plotted on a background map in 5-dB increments from 65 dBA to 85 dBA, as applicable. Noise contours associated with current activities at Keesler AFB are shown in Figure 3-1. The land area (in acres) encompassed by each contour is shown in Table 3-5.

Table 3-5 Land Areas Exposed to Indicated Sound Levels

Sound Level (in L_{dn})	Acres of Land		
	On Base	Off Base	Total
65 – 70	285.00	98.29	383.29
70 – 75	177.37	12.20	189.57
75 – 80	91.28	0.00	91.28
80 – 85	1.41	0.00	1.41
> 85	0.00	0.00	0.00
Total	**555.06**	**110.49**	**665.55**

L_{dn} Day-Night Average Sound Level

Source: Wasmer and Maunsell 2002

In order to further assess noise exposure from aviation activity, 13 locations around the base were selected for specific analysis. These points of interest represent land use categories that could be potentially sensitive to elevated noise levels. Noise exposure at these points is shown in Table 3-6, and the location of the points of interest is depicted in Figure 3-1. As shown, with the exception of those points in immediate proximity to the runways, all other sensitive land uses are well below noise levels that would cause concern.

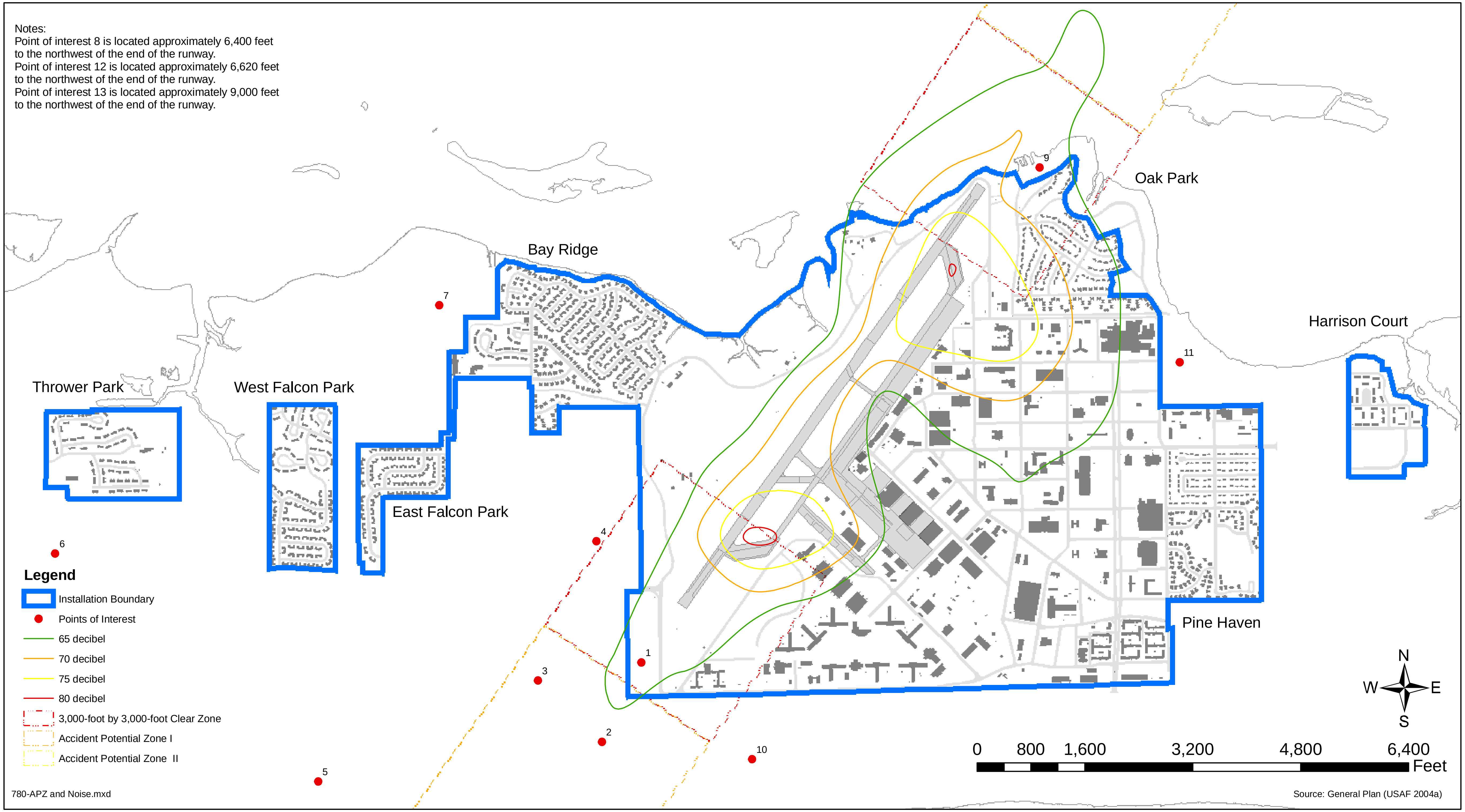

Figure 3-1 Baseline Noise Contours with Accident Potential Zones, Keesler Air Force Base, Mississippi

Table 3-6 Noise Exposure at Specific Points of Interest

Point of Interest Number	Location	Noise Level in L_{dn}
1	Point 1,100 feet southwest of Runway 21	68.1
2	Point 2,400 feet southwest of Runway 21	65.3
3	Point west-southwest of Runway 21	58.4
4	Jeff Davis Elementary School	56.9
5	Point southwest of Runway 21	50.3
6	Our Lady of Fatima Church / School	48.6
7	Biloxi National Cemetery	48.0
8	Point north of Runway 03	51.1
9	Point northeast of Runway 03	66.6
10	West End Elementary School	55.0
11	Biloxi Regional Medical Center	60.7
12	D'Iberville Elementary School	51.8
13	D'Iberville Middle School	49.4

L_{dn} Day-Night Average Sound Level

Source: BASEOPS/NOISEMAP model (Moulton 1990) output

3.3.1.4 Other Ground-based Activity

Operations, maintenance, and industrial activities on Keesler AFB generate non-aircraft related noise. Noise sources include transportation noise from the operation of ground-support equipment. However, this noise is generally localized in industrial areas on or near the airfield, or on established lines of communication supporting traffic to and from the airfield. Noise is also generated from other commercial activities located near the airfield. Noise resulting from aircraft operations remains the dominant noise source in the airfield region.

3.3.2 Aircraft Management and Air Traffic Control

3.3.2.1 Definition of Resource

Airspace management involves the direction, control, and handling of flight operations in the volume of air that overlies the geopolitical borders of the US and its territories. Airspace is a resource managed by the Federal Aviation Administration (FAA), with established policies, designations, and flight rules to protect aircraft in the airfield and en route; in Special Use Airspace (SUA) identified for military and other governmental activities; and in other military training airspace. Management of this resource considers how airspace is designated, used, and administered to best accommodate the individual and common needs of military, commercial, and general aviation. Because of these multiple and sometimes competing demands, the FAA considers all aviation airspace requirements in relation to airport operations, Federal Airways, Jet Routes, military flight training activities, and other special needs to determine how the National Airspace System can best be structured to satisfy all user requirements.

The FAA has designated four types of airspace above the US. They are Controlled, Special Use, Other, and Uncontrolled airspace and are defined as follows:

Controlled Airspace

Controlled Airspace is categorized into five separate classes: Class A, B, C, D, and E airspace. These classes identify airspace that is controlled, airspace that supports airport operations, and designated airways affording en route transit from place to place. These classes also dictate pilot qualification requirements, rules of flight that must be followed, and the type of equipment necessary to operate within that airspace.

Controlled Airspace is defined by FAA by Order 7400.2. It is airspace of defined dimensions within which Air Traffic Control (ATC) service is provided to Instrument Flight Rule (IFR) flights and to Visual Flight Rule (VFR) flights in accordance with the airspace classification. For IFR operations in controlled airspace, a pilot must file an IFR flight plan and receive an appropriate ATC clearance.

Each Class B, C, and D airspace designated for an airport contains at least one primary airport around which the airspace is designated.

Class A Airspace

Class A airspace, generally, is that airspace from 18,000 feet above mean sea level (amsl) up to and including flight level (FL) 600. Class A airspace includes the airspace overlying the waters within 12 nautical miles (NM) of the coast of the 48 contiguous states and Alaska (Department of Transportation [DOT] 2001).

Class B Airspace

Class B airspace, generally, is that airspace from the surface to 10,000 feet amsl around the nation’s busiest airports. The actual configuration of Class B airspace is individually tailored and consists of a surface area and two or more layers, and is designed to contain all published instrument procedures (DOT 2001).

Class C Airspace

Class C airspace, generally, is that airspace from the surface to 4,000 feet above the airport elevation (charted in amsl) surrounding those airports that have an operational control tower, are serviced by a radar approach control, and that have a certain number of IFR operations or passenger enplanements. Although the actual configuration of Class C airspace is individually tailored, it usually consists of a surface area with a 5 NM radius, and an outer circle with a 10 NM radius that extends from 1,200 feet to 4,000 feet above the airport elevation (DOT 2001).

Class D Airspace

Class D airspace, generally, is that airspace from the surface to 2,500 feet above the airport elevation (charted in amsl) surrounding those airports that have an operational control tower. The configuration of each Class D airspace area is individually tailored and when instrument procedures are published, the airspace will normally be designed to contain the procedures. Arrival extensions for instrument approach procedures may be designated as Class D or Class E airspace (DOT 2001).

Class E Airspace

Class E airspace is controlled airspace that is not Class A, B, C, or D. There are seven types of Class E airspace, as described below.

- **Surface Area Designated for an Airport**. When so designated, the airspace will be configured to contain all instrument procedures.

- **Extension to a Surface Area.** There are Class E airspace areas that serve as extensions to Class B, C, and D surface areas designated for an airport. This airspace provides controlled airspace to contain standard instrument approach procedures without imposing a communications requirement on pilots operating under VFR.

- **Airspace used for Transition.** There are Class E airspace areas beginning at either 700 or 1,200 feet above ground level (AGL) used to transition to/from the terminal or en route environment.

- **En Route Domestic Airspace Areas.** These areas are Class E airspace areas that extend upward from a specified altitude to provide controlled airspace where there is a requirement for IFR en route ATC services, but where the Federal Airway system is inadequate.

- **Federal Airways.** Federal Airways (Victor Routes) are Class E airspace areas, and, unless otherwise specified, extend upward from 1,200 feet to, but not including, 18,000 feet amsl.

- **Other.** Unless designated at a lower altitude, Class E airspace begins at 14,500 feet amsl to, but not including 18,000 feet amsl overlying (a) the 48 contiguous states, including the waters within 12 miles from the coast of the 48 contiguous states; (b) the District of Columbia; (c) Alaska, including the waters within 12 miles from the coast of Alaska, and that airspace above FL 600; (d) excluding the Alaska peninsula west of 160°00’00” west longitude, and the airspace below 1,500 feet above the surface of the earth unless specifically so designated.

- **Offshore/Control Airspace Areas.** This includes airspace areas beyond 12 NM from the coast of the United States, wherein ATC services are provided (DOT 2001).

Uncontrolled Airspace

Airspace that has not been designated as Class A, B, C, D, or E airspace is Uncontrolled Airspace (Class G) (DOT 2001).

Special Use Airspace

An SUA includes Military Operations Areas (MOA), Air Traffic Control Assigned Airspace (ATCAA), Warning Areas, and Restricted Areas.

Military Operations Airspace

An MOA is airspace of defined vertical and lateral limits established outside Class A airspace to separate and segregate certain non-hazardous military activities from IFR traffic and to identify for VFR traffic where these activities are conducted. Class A airspace covers the continental US and limited parts of Alaska, including the airspace overlying the water within 12 NM of the US coast. It extends from 18,000 feet amsl up to and including 60,000 feet amsl. MOAs are considered "joint use" airspace. Non-participating aircraft operating under VFR are permitted to enter a MOA, even when the MOA is active for military use. Aircraft operating under IFR must remain clear of an active MOA unless approved by the responsible Air Route Traffic Control Center (ARTCC). Flight by both participating and VFR non-participating aircraft is conducted under the "see-and-avoid" concept, which stipulates that "when weather conditions permit, pilots operating IFR or VFR are required to observe and maneuver to avoid other aircraft. Right-of-way rules are contained in CFR Part 91." The responsible ARTCC provides separation service for aircraft operating under IFR and MOA participants. The "see-and-avoid" procedures mean that if a MOA were active during inclement weather, the general aviation pilot could not safely access the MOA airspace.

Air Traffic Control Assigned Airspace

An ATCAA is airspace of defined vertical and lateral limits, assigned by ATC, for the purpose of providing air traffic segregation between the specified activities being conducted within the assigned airspace and other IFR air traffic. This airspace, if not required for other purposes, may be made available for military use. ATCAAs are normally structured and used to extend the horizontal and/or vertical boundaries of SUA such as MOAs and Restricted Areas.

Warning Area

A Warning Area is airspace of defined dimensions extending from 3 NMs outward from the coast of the United States that contains activity that may be hazardous to nonparticipating aircraft. The purpose of such warning area is to warn nonparticipating pilots of the potential danger. A warning area may be located over domestic or international waters or both.

Restricted Areas

A Restricted Area is designated airspace that supports ground or flight activities that could be hazardous to non-participating aircraft. A Restricted Area is airspace designated under 14 CFR Part 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated "joint-use" and IFR/VFR operations in the area may be authorized by the controlling ATC facility when it is not being utilized by the using agency.

Other Airspace

Other Airspace consists of advisory areas, areas that have specific flight limitations or designated prohibitions regarding use.

3.3.2.2 Existing Conditions

The Keesler AFB control tower manages air traffic into, and out of, Keesler AFB. Overall, air traffic in the region is under the control of Houston.

To facilitate air traffic control and management in the area, Controlled Airspace has been established around regional airfields. Specifically, this includes Keesler AFB and Gulfport/Biloxi International Airport (GPT) located to the west of Keesler AFB. Class D and Class E Controlled Airspace exist around both airfields, and abut approximately mid-way between Keesler AFB and GPT.

Military Training Airspace supporting operations at Keesler AFB includes MOAs, Warning Areas, Restricted Areas, and Military Training Routes. Descriptions of SUA are presented in Tables 3-7 and 3-8.

Table 3-7 MOA/Warning Area Identification and Description

MOA/ Warning Area	Altitudes		Hours of Use[1]		Controlling ARTCC
	Minimum	Maximum	From	To	
Desoto 1	500 AGL	10,000 amsl	8:30 AM	5:30 PM	Houston
Desoto 2	100 AGL	5,000 amsl	8:30 AM	5:30 PM	Houston
W-453	Surface	FL 500[2]	Sunrise	Sunset	Houston

Note:
[1]Hours of use shown are published times. Other times may be scheduled by Notices to Airmen.
[2]FL = Flight Level - Described in terms of hundreds of feet amsl, using a standard altimeter setting. Thus, FL 500 is approximately 50,000 feet amsl.

MOA Military Operations Area
AGL above ground level
amsl above mean sea level
ARTCC Air Route Traffic Control Center
FL flight level

Source: DOT 2006

Table 3-8 Restricted Airspace Identification and Description

Restricted Area	Altitudes		Hours of Use		Controlling ARTCC
	Minimum	Maximum	from	to	
R-4401A	Surface	4,000 amsl	by NOTAM	Houston	R-4401A
R-4401B	4,000 amsl	18,000 amsl	by NOTAM	Houston	R-4401B
R-4401C	18,000 amsl	29,000 amsl	by NOTAM	Houston	R-4401C

ARTCC Air Route Traffic Control Center
amsl above mean se level
NOTAM Notices to Airmen

Source: DOT 2006

Airdrop training is conducted by the unit at the Stennis 2 Drop Zone (DZ) on Stennis Airport, the Steinhawk DZ on Keesler AFB, and the Ralffee East Air to Ground Range on Camp Shelby.

On average, the 815 AS conducts approximately 650 annual sorties and the 53 WRS conducts approximately 580 annual sorties in these local airspace areas.

3.3.3 Land Use

3.3.3.1 Definition of the Resource

Land use comprises natural conditions or human-modified activities occurring at a particular location. Human-modified land use categories include residential, commercial, industrial, transportation, communications and utilities, agricultural, institutional, recreational, and other developed use areas. The attributes of land use considered in this analysis include general land use patterns, land ownership, land management plans, and special use areas. General land use patterns characterize the types of uses within a particular area including agricultural, residential, military, and recreational. Land ownership is a categorization of land according to type of owner. The major land ownership categories include private, federal, and state. Management plans and zoning regulations determine the type and extent of land use allowable in specific areas and are often intended to protect specially designated or environmentally sensitive areas. Certain land use designations are particular to military installations and incompatible with residential areas. These include clear zones and accident potential zones. Areas at the end of each runway typically delineate geographic areas around the airfield where historic aircraft mishap data have shown most aircraft accidents occur. Three zones were established based on these accident patterns: the clear zone, Accident Potential Zone 1 (APZ I), and Accident Potential Zone 2 (APZ II). The clear zone, the area closest to the runway end, is the most hazardous and must be clear of any development. Some development is allowed in APZ I and APZ II, although this development is usually limited to light industrial, manufacturing, transportation, and similar land use categories. However, uses that concentrate people in small areas are not considered acceptable.

Noise is another factor in determining appropriate land uses since elevated sound levels are incompatible with residential areas. As described in Sections 3.3.1.1 and 3.3.1.2, sound levels are typically measured in decibels using L_{dn} as the standard of measurement.

Numerous studies have shown a relationship between L_{dn} and the percentage of the population likely to be highly annoyed. Residential areas are typically inconsistent with noise levels above L_{dn} 65 dB.

Visual resources are the natural and man-made features that give a particular environment its aesthetic qualities. In undeveloped areas, landforms, water surfaces, and vegetation are the primary components that characterize the landscape. Man-made elements such as buildings, fences, and streets may also be visible. These may dominate the landscape or be relatively unnoticeable. In developed areas, the natural landscape is more likely to provide a background for more obvious man-made features. The size, forms, materials, and functions of buildings, structures, roadways, and infrastructure will generally define the visual character of the built environment. These features form the overall impression that an observer receives of an area or its landscape character. Attributes used to describe the visual resource value of an area include landscape character, perceived aesthetic value, and uniqueness.

The ROI for land use and visual resources includes Keesler AFB and the area surrounding the base that may be affected by aircraft noise.

3.3.3.2 On-base Land Use

Keesler AFB encompasses 1,558 acres and includes a variety of land use categories such as airfield and aircraft operation and maintenance, industrial, technical training, and housing. Table 3-9 presents the 14 land use categories (based on function of the activity within the category) that have been established for land management at the base within the Keesler AFB *General Plan* (USAF 2004a). Accompanied housing is the base's largest category, accounting for 400 acres of the base's total acreage. The next two largest land use categories are outdoor recreation (237 acres) and unaccompanied housing (126 acres).

Keesler AFB is a federally owned and managed installation located within the city limits of Biloxi, Mississippi. Properties immediately surrounding the base are privately owned lands also within the City of Biloxi. Several plans and programs guide land use planning on Keesler AFB. The "Land Use and Transportation" component of the Keesler AFB *General Plan* presents planning strategy to support military missions assigned to the installation. The *General Plan* provides information regarding the installation and describes existing land uses, a planning analysis of constraints and opportunities, future land use, and implementation guidelines. The *General Plan* presents factors affecting both on- and off-base land use and includes recommendations to on-base officials and local community leaders to ensure compatible development (USAF 2004a).

The Air Installation Compatible Use Zones (AICUZ) program, which delineates noise contours, also promotes compatible development around Air Force installations. An AICUZ study provides installation commanders and local governments with recommendations for land use restrictions.

Table 3-9 Air Force Land Use Categories

Air Force Land Use Categories	Description
Aircraft Operations and Maintenance	Base operations, control tower, fire station, maintenance hangers, shops, and docks.
Administrative	Headquarters, civilian personnel, education center, law center, and security operations.
Airfield	Aircraft operating areas.
Airfield Pavement	Runways, taxiways, and aprons.
Community Commercial	Commissary, exchange, club, dining hall, recreation center, gym, and theater.
Community Service	Post office, library, chapel, childcare center, and education center.
Housing Accompanied	Family housing.
Housing Unaccompanied	Dormitories and visitors' housing.
Industrial	Base engineering, maintenance shops, storage, warehousing, and utilities.
Medical	Hospital, clinic, and medical storage.
Open Space/Roads	Conservation area, buffer space, and undeveloped land.
Outdoor Recreation	Swimming pool, outdoor courts and field, golf course, and marina.
Technical Training	Classroom buildings.
Water	Lakes, ponds, and major streams.

Figure 3-1 depicts noise contours and APZs for the installation based on the most recent AICUZ study data. The designated clear zones at Keesler AFB are located at either end of the runway and the APZs extend beyond the clear zone from the ends of the runway.

3.3.3.3 Off-base Land Use

Urban development within the City of Biloxi occurs to the east, south, and west of the base. The City of D'Iberville, Mississippi, is north of the Back Bay of Biloxi. Land uses surrounding Keesler AFB primarily consist of strip commercial development along major roads and intersections, and single and multi-family residential units. US Highway 90 runs south of the installation along a commercial and recreational corridor. This corridor runs parallel to the Mississippi Sound and is the focal point for the casino and resort industry in Biloxi.

The City of Biloxi enacted a new Land Development Ordinance on 03 September 2003 that governs the land use in the areas surrounding Keesler AFB. The city maintains zoning and ordinance maps that regulate such issues as the height of new construction, buffer zones, and setbacks; it is designed to help residents and business owners better understand the city's process of land use planning and zoning.

Keesler AFB completed a Joint Land Use Study (JLUS) in 1998 with local jurisdictions. The JLUS is a cooperative effort between the installation and local governments to develop an enforceable airport-compatible land use plan. The City of

Biloxi has used the JLUS information and adopted it into its Land Development Ordinance (USAF 2004a).

Keesler AFB's noise impact and accident potential extend along the extended runway centerline: northeast into the City of D'Iberville and southwest into Biloxi. Off-base residential areas are located in APZ I at both ends of the runway. The affected areas include the cities of Biloxi and D'Iberville.

3.3.4 Earth Resources

Earth resources include geology, topography, and soils. Geologic resources of an area typically consist of surface and subsurface materials and their inherent properties. Topography refers to the configuration of the land surface, including its relief and the position of its natural and man-made features. The term "soils" refers to unconsolidated materials formed from the underlying bedrock and other parent material. Soils have a critical role in both the natural and human environment. Soil drainage, texture, strength, shrink-swell potential, and erodibility all determine the sustainability of the ground to support man-made structures and facilities. These resources may be of scientific, historical, economical, and recreational value.

The ROI for earth resources includes the area immediately underlying Keesler AFB.

3.3.4.1 Geology

A series of unconsolidated estuarine and deltaic sediments ranging in age from the Miocene to Recent Epoch underlies the coastal area of Mississippi. These sediments are not easily separated into stratigraphic units and are usually differentiated first based on paleontological evidence, then based on lithology. The significant geologic units present beneath Keesler AFB include Pleistocene and Recent Epoch costal and terrace deposits and alluvium. Local relief on Kessler AFB is primarily the result of past depositional and more recent erosional processes such as hurricanes. The Citronelle, Graham Ferry, and Pascagoula Formations (Pliocene Epoch) and the Hattiesburg Formation and Catahoula Sandstone (Miocene Epoch) underlay these Recent Epoch deposits (USAF 1997a).

3.3.4.2 Topography

The Gulf Coast Geosynclines, a large sinking trough of delta-deposited sediments in the Gulf of Mexico, dominates the regional geologic structure. Records of on-base drilling show recent and costal deposits directly overlying the Graham Ferry formation containing layers of gumbo, shells, clay, sand, and shale. Keesler AFB is located within the Pamlico Plain, a major landform in the East Gulf subdivision of southern Mississippi. The Pamlico Plain is generally flat or gently undulating, with elevations averaging from 5 to 30 feet above mean sea level (USAF 2000a).

3.3.4.3 Soils

Regional soils are predominately derivatives of beaches, dunes, marine estuaries, tidal flats, and low terraces. Local lowlands and marshes are found on silty organic soils, whereas uplands are well-drained, nutrient-poor soils consisting of sand and silty loams. Sandy or loamy upland materials provide the foundation for the dominant soil types on the installation. Most soils have low erosion potential under normal conditions (natural vegetative cover, average rainfall, etc.), low shrink-swell potential, and are nutrient poor. Such sandy soils have a good to fair drainage capability and an estimated bearing capacity of 3,000 to 5,000 pounds per square foot (USAF 2000a).

3.3.5 Water Resources

3.3.5.1 Definition of the Resource

Water resources analyzed in this EA include descriptions of the qualitative and quantitative characteristics of water resources, including surface waters, groundwater, and floodplains. Surface waters include streams, rivers, bays, ponds, and lakes and are important for a variety of reasons including economic, ecological, recreational, and human health. Groundwater consists of the subsurface hydrologic resources of the physical environment and is an essential resource. Groundwater properties are often described in terms of depth to the aquifer or water table, water quality, and surrounding geologic composition. Groundwater is important as a water source for potable water, irrigation, and industrial purposes.

Other issues relevant to water resources include the downstream water and watershed areas affected by existing and potential runoff and hazards associated with the 100-year floodplain. Stormwater flows, which usually increase in volume and velocity with increases in impervious surfaces such as rooftops and paved areas, have the potential to impact surface water hydrology. The State of Mississippi has developed and retains primacy for surface water quality standards for all waters of the state in accordance with the provisions of the Clean Water Act. Mississippi follows an anti-degradation policy that is intended to protect the water quality that existed at the time water quality standards were adopted and to enhance water quality when possible (Mississippi Department of Environmental Quality [MDEQ] 2003).

Floodplains are defined by EO 11988, *Floodplain Management*, as “the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year” (that area inundated by a 100-year flood). Floodplain vegetation promotes bank stability, filters excess nutrients, pollutants, and sediments from the water, and moderates flooding by absorbing surface water runoff.

EO 11988 requires that federal agencies avoid adverse impacts associated with the occupancy and modification of floodplains and avoid floodplain development whenever possible. Federal agencies are also required to make every effort to reduce the risk of flood loss, minimize the impact of floods on human health, safety, and welfare, and preserve the natural beneficial value of floodplains. Areas identified as located within Special Flood Hazard Areas (SFHA) are those areas determined by the Federal Emergency Management Agency (FEMA) that would be inundated by a flood having a one percent chance of occurring in any given year. This area is designated the “100-year floodplain.” Development may take place within the SFHA if the development is compliant with local floodplain management ordnances (which must meet minimum federal requirements).

Keesler AFB was damaged by Hurricane Katrina and lost the full use of some areas of the installation. The current SFHA is the 11-foot contour, the legislative requirement established under the National Flood Insurance Program. The revised floodplain recommended by FEMA has increased in elevation from 11 to 16 feet above sea level; however, compliance with the floodplain contour is not currently a legislative requirement (FEMA 2006). The 16-foot contour was recommended by FEMA with consideration to new wave zone mapping performed after Hurricane Katrina (Figure 3-2). For purposes of the evaluation in this EA, the recommended revised SFHA (100-year floodplain) was used.

3.3.5.2 Surface Water

Keesler AFB is located on a peninsula between the Back Bay of Biloxi and the Mississippi Sound, north of the Gulf of Mexico. No permanent flowing streams traverse the installation. The only surface water impoundments on Keesler AFB are two small water-hazard ponds on the base's golf course. These two ponds have a total surface area of approximately 3 acres (USAF 2002). The Back Bay of Biloxi and its coastal tidal marshes are considered environmentally sensitive areas (USAF 2001a).

Several small tidal creeks near Keesler AFB contribute little fresh water to the system during dry conditions. However, during storm events, the creeks receive stormwater runoff from the base. The two largest, Bayou LaPorte and Keegan Bayou, are located to the west and east of the base, respectively. Between the two bayous, numerous small tidal creeks receive discharge from stormwater outfalls. At least three of these creeks drain into the marsh north of the golf course (USAF 2001a).

The Back Bay of Biloxi is a tidal estuary located along the northern edge of Keesler AFB and receives the majority of the stormwater discharged from the base. The Back Bay of Biloxi, including Big Lake at its western end, encompasses an area of approximately 10 square miles (6,400 acres). Principal water sources for the Back Bay of Biloxi include freshwater streams from the Biloxi River basin, Tchoutacabouffa River basin, Bernard Bayou basin, Old Fort Bayou basin, and Biloxi Peninsula. The saline waters of the Mississippi Sound enter the Back Bay via Biloxi Bay (USAF 2001a).

The Back Bay of Biloxi is experiencing considerable environmental stress, and point source and nonpoint source pollution heavily impacts its southern shore. Sixty-four percent of the base's total stormwater drainage discharges directly to the Back Bay. Another 27 percent of stormwater discharges to the Back Bay via Bayou LaPorte and Keegan Bayou. The remaining 9 percent of base stormwater drainage is routed to Biloxi's storm sewer system, which empties into Mississippi Sound. Through its SWPPP, Keesler AFB manages industrial activities, such as fuel handling, to prevent stormwater pollution (USAF 2004a).

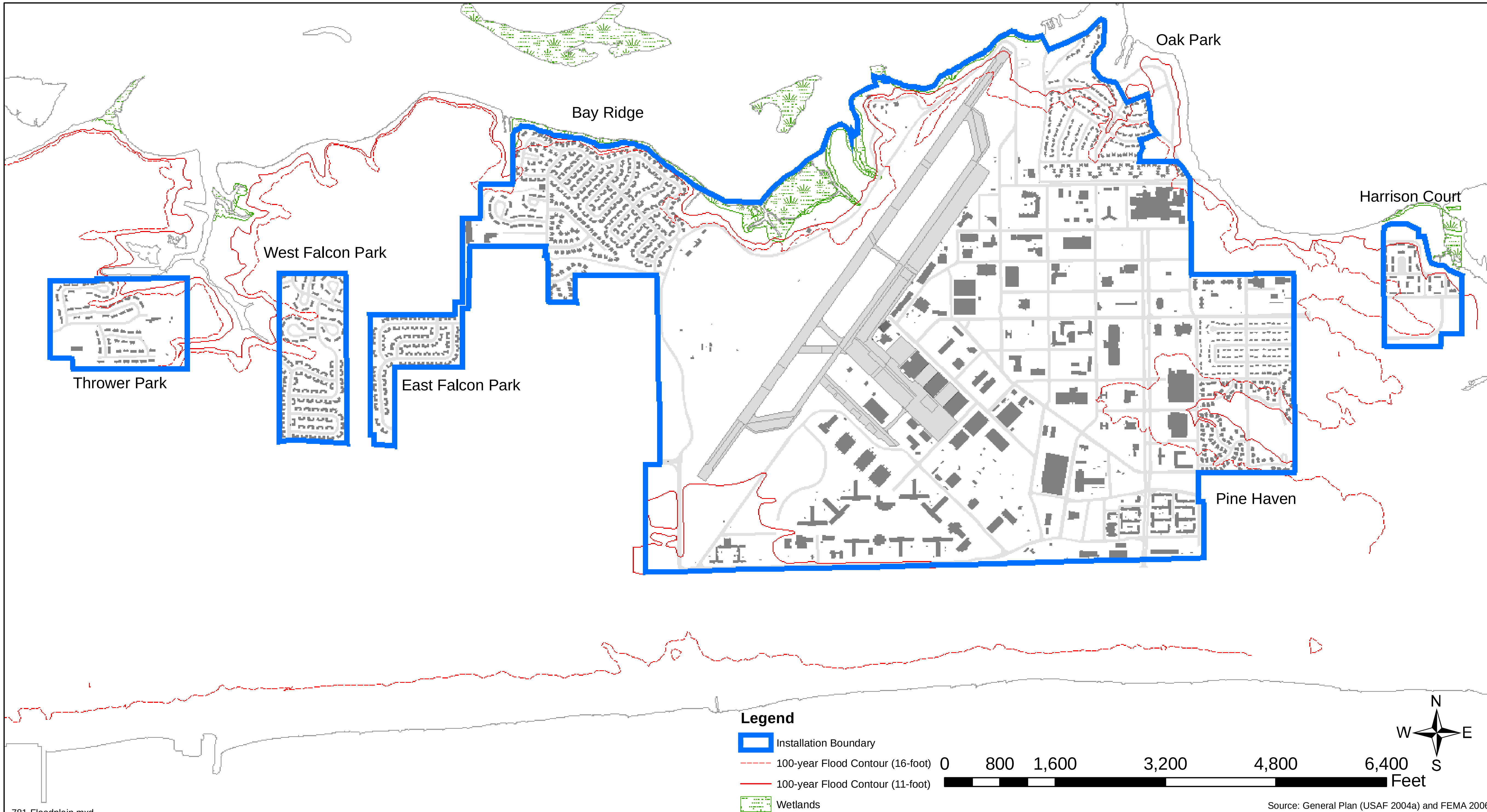

Figure 3-2 100-year Floodplain Contour, Keesler Air Force Base, Mississippi

3.3.5.3 Groundwater

There is an abundance of fresh groundwater within the aquifers of Harrison County and specifically in the aquifers beneath Keesler AFB. Water-bearing sands capable of supporting large withdrawal rates in the vicinity of Keesler AFB are present at depths of 400, 600, 800, and 1,200 feet below ground surface (bgs).

The sands are typically irregular in thickness and continuity, but most have high transmissivities that range from 50,000 to 100,000 gallons per foot per day. Most major water supplies in the county obtain fresh groundwater from wells completed at depths from 600 to 1,200 feet bgs (USAF 2000b). The water supply wells that support Keesler AFB are all located in the 600-feet bgs sand. The City of Biloxi operates eight wells within approximately 1 mile of Keesler AFB. The Biloxi wells are typically screened in the sands 600-, 800-, or 1,200-feet bgs, with one well competed in the 400-feet bgs sand.

Groundwater withdrawal from these water-bearing sands has gradually drawn down the static water level from flowing artesian conditions in the early 1900s to several tens of feet bgs today. The initial Keesler AFB water supply wells installed in the 600 feet bgs sand in 1941 flowed at ground surface under artesian conditions. As the base grew and demand for water increased, the static water level was drawn down to the current average of approximately 74 feet bgs (USAF 2000b).The groundwater beneath Keesler AFB, similar to that in the rest of Harrison County, contains a soft sodium bicarbonate type of water. Keesler AFB draws all of its potable water from the 600-feet sands of the Graham Ferry Formation. Concentrations of calcium, magnesium, potassium, chloride, and sulfate rarely exceed 15 parts per million (ppm) in the vicinity of Keesler AFB.

An adequate amount of water still exists in the 600-foot sand, despite the overall decline in the average static water level. The City of Biloxi is currently drilling to the sands at 800 and 1,200 feet bgs to help alleviate demands made on the Graham Ferry Formation (USAF 2006c).

Concerns of potential saltwater intrusion may affect the current and potential future groundwater withdrawal rates from the 600-foot sand. The continued development of groundwater supplies along the coast increases the possibility of saltwater intrusion by lowering the water table or potentiometric surface to the point where saltwater is induced to migrate into the fresh water part of the aquifer. This migration of saltwater may eventually reduce the quality and quantity of the fresh groundwater available for use as potable water.

3.3.5.4 Floodplains

Keesler AFB experienced flooding problems throughout the base during Hurricanes Georges and Katrina. The effects of Hurricane Katrina severely damaged major portions of all of the on-base housing areas along with significant damage to other structures throughout the base. Figure 3-2 delineates the 100-year floodplain contour and the areas of Keesler AFB that are impacted. As discussed previously, the 100-year floodplain depicted on Figure 3-2 is based on the revised 16-foot elevation contour recommended by FEMA (FEMA 2006).

3.3.6 Hazardous Materials and Waste

Hazardous materials may be defined as any substance that due to quantity, concentration, physical, chemical, or infectious characteristics, may present a danger to public health, welfare, or the environment. Hazardous waste is defined as any solid, liquid, contained gaseous or semisolid waste, or any combination of wastes that pose a substantive present or potential hazard to human health or the environment. In addition, hazardous waste must meet either a hazardous characteristic of ignitability, corrosivity, toxicity, or reactivity under 40 CFR 261, or be listed as a waste under 40 CFR 261. Solid waste is waste that does not meet the requirement for hazardous waste. Based on an evaluation of existing conditions at Keesler AFB, the following items are relevant to this assessment and are addressed in this section: hazardous materials, hazardous waste, Environmental Restoration Program (ERP) sites, polychlorinated biphenyls (PCB), lead-based paint (LBP), and asbestos.

3.3.6.1 Hazardous Materials

The management of hazardous materials at Keesler AFB is accomplished in accordance with Air Force Instruction (AFI) 32-7086, *Hazardous Materials Management*, which incorporates the requirements of all federal regulations, other AFIs, and DoD Directives for the reduction of hazardous material uses and purchases (USAF 2004c). Keesler AFB has produced and implemented the *Hazardous Materials Emergency Planning and Response Compliance Plan* and the *Keesler Air Force Base Spill Prevention and Response Plan* to assist in local compliance requirements (USAF 2004a).

3.3.6.2 Hazardous Waste

Keesler AFB is currently regulated as a large-quantity generator of hazardous waste. All hazardous wastes are regulated under *Resource Conservation and Recovery Act* (RCRA) by USEPA, unless otherwise exempted by *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) regulations. Within the State of Mississippi, hazardous wastes are regulated and enforced by the MDEQ. All hazardous wastes from Keesler AFB are handled, stored, transported, disposed, or recycled in accordance with both USEPA and MDEQ regulations (USAF 2002). The Air Force goal is to recycle resources for reuse when possible and economically feasible. Waste minimization and recycling are emphasized with hazardous waste disposal as the last resort. Keesler AFB manages hazardous wastes through the implementation of the *Keesler Hazardous Waste Management Plan* (USAF 2004c).

3.3.6.3 Environmental Restoration Program

The Air Force uses the ERP to identify, characterize, clean up, and restore sites contaminated with toxic and hazardous substances, low-level radioactive materials, petroleum, oils, lubricants, and other pollutants and contaminants. Between 1987 and 1995, Keesler AFB was assessed for potential hazardous waste sites, and 38 potential ERP sites were grouped based on their investigative status. There are 16 sites that have land use controls. Figure 3-3 identifies the 14 open ERP sites at Keesler AFB. Table 3-10 identifies the 14 open ERP sites and the 24 closed sites.

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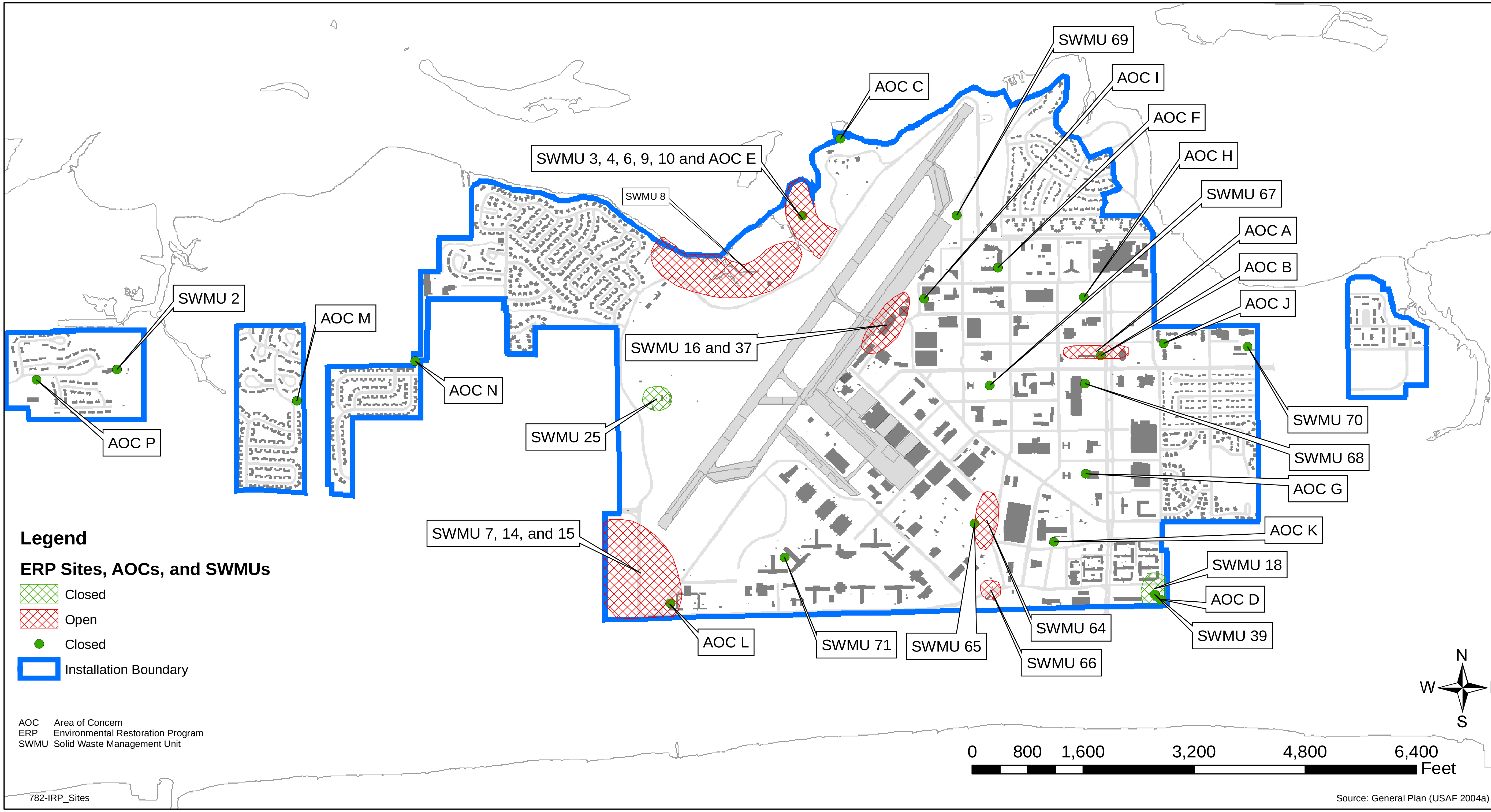

Figure 3-3 Environmental Restoration Program Sites, Areas of Concern, and Solid Waste Management Units, Keesler Air Force Base, Mississippi

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Table 3-10 Environmental Restoration Program Sites, Areas of Concern, and Solid Waste Management Units at Keesler AFB

SWMU/AOC	Site Description	Period of Use	Type of Waste	Site Status
Open Sites				
SWMU 3	Old Fire Protection Mock-Up Area	1955-1981	Jet propellant-4 (JP-4) and diesel fuels	Remedy in Place, LTM, and LUC
SWMU 4	New Fire Protection Mock-Up Area	1981-1989	JP-4 and diesel fuels	Remedy in Place, LTM, and LUC
SWMU 6	Smaller Concrete Burn Area at Landfill 3	1981-1989	JP-4 and diesel fuels	Remedy in Place, LTM, and LUC
SWMU 7	Landfill 1	1941-1950	Base refuse	Remedy in Place, LTM, and LUC
SWMU 14	TEL Sludge Disposal Site in Landfill 1	1942	AVGAS sludge containing TEL	Remedy in Place, LTM, and LUC
SWMU 15	Low-Level Radioactive Waste Burial Vault	1950s to 1960s	Low-level radioactive waste (iodine-125, cobalt-57, and radium)	Remedy in Place, LTM, and LUC
SWMU 8	Landfill 2	1947-1948	Base refuse, paints, paint cans and paint solvents	Remedy in Place, LTM, and LUC
SWMU 9	Landfill 3	1950-1974	Construction and demolition debris	Remedy in Place, LTM, and LUC
SWMU 10	Drum Storage Area	1972-1989	Asphalt sealant mix, diesel fuel, soaps, and solvents	Remedy in Place, LTM, and LUC
SWMU 16	Etching Shop Draining Pit	1941-1981	Shop wastes, acids, organic solvents, ferric chloride, potassium ferric cyanide, and heavy metals	Remedy in Place, LTM, and LUC
SWMU 37	Silver Recovery Area	1941-1981	Photographic materials, silver, mercury, cyanide, aluminum sulfate, and barium sulfate	Remedy in Place, LTM, and LUC
SWMU 64	Old Military Service Station USTs	1941-1965	Gasoline, diesel fuel, and mixed solvents	Remedy in Place, LTM, and LUC
SWMU 66	Building 4038 Abandoned UST	Unknown-1987	Gasoline and diesel fuel	Remedy in Place, LTM, and LUC
AOC A	Base Exchange Service Station Abandoned UST	Unknown-1987	Gasoline	Remedy in Place, LTM, and LUC
Closed Sites				
SWMU 2	TEL Sludge Disposal Site at Training Annex 1	1970	Drums of TEL Sludge bottoms	Closed, No Further Action
SWMU 18	Old Civil Engineering Storage Area	1955-1983	Transformers containing PCBs	Remedy in Place, LTM, and LUC

AOC	Area of Concern	LUC	land use control	SWMU	Solid Waste Management Unit
AVGAS	aviation gasoline	No.	number	TEL	tetraethyl lead
JP-4	jet propellant-4	PCB	polychlorinated biphenyl	UST	underground storage tank
LTM	long term monitoring				

Table 3-10, Continued

SWMU/AOC	Site Description	Period of Use	Type of Waste	Site Status
Closed Sites				
SWMU 25	Pesticide Rinse Disposal Pit	Mid 1960s -1981	Chlorinated pesticides mixed in oil-based medium such as kerosene or diesel fuel	Closed, No Further Action
SWMU 39	Transformer Storage Area	1955-1983	Transformers containing PCB	Closed, No Further Action
AOC B	Diesel Fuel Spill Near Building 2010	Unknown	Diesel fuel	Closed, No Further Action
AOC C	Gas spill at Naval Reserve Park	1983	Gasoline	Closed, No Further Action
AOC D	Civil Engineering Storage Yard	1955-1983	Transformers with PCBs	Closed, No Further Action
AOC E	Asphalt Sealant Spray Area	Unknown	Asphalt sealant	Remedy in Place, LTM, and LUC
SWMU 65	AVGAS Hydrant Fuel System	1940s-1956	AVGAS	Closed, No Further Action
SWMU 67	Water well No. 2 UST, Building 1921	1940s/50s-1979	Generator Fuel	Closed, No Further Action
SWMU 68	Water Well No. 4 UST, Building 2121	1940s/50s-1979	Generator Fuel	Closed, No Further Action
SWMU 69	Water Well No. 7 UST, Building 0242	1940s/50s-1979	Generator Fuel	Closed, No Further Action
SWMU 70	Water Well No. 8, UST, Building 6009	1940s/50s-1979	Generator Fuel	Closed, No Further Action
SWMU 71	Water Well No. 10 UST, Building 7301	1960s-1979	Generator Fuel	Closed, No Further Action
AOC G	Water Well No. 1 UST, Building 3509	Unknown	No UST found in this area	Closed, No Further Action
AOC H	Water Well No. 3 UST, Building 0621	Unknown	No UST found in this area	Closed, No Further Action
AOC I	Water Well No. 3, UST Building 0916	Unknown	No UST found in this area	Closed, No Further Action
AOC J	Water Well No. 6, UST Building 5705	Unknown	No UST found in this area	Closed, No Further Action
AOC K	Water Well No. 9 UST, Building 3967	1950s-1979	Generator Fuel	Closed, No Further Action
AOC L	Water Well No. 11 UST, Building	Unknown	Generator Fuel	Closed, No Further Action
AOC M	Water Well No. 11 UST, Building 7501	Unknown	Generator Fuel	Closed, No Further Action
AOC N	Water Well No. 12 UST, Building 9160	1970s-1979	Generator Fuel	Closed, No Further Action
AOC P	Water Well UST, Annex No. 1, Building 10003	1950s-Undetermined	Generator Fuel	Closed, No Further Action
AOC F	Sanitary Sewer	1940s-Present	Generator Fuel	Closed, No Further Action

AOC	Area of Concern	LUC	land use control	SWMU	Solid Waste Management Unit
AVGAS	aviation gasoline	No.	number	TEL	tetraethyl lead
JP-4	jet propellant-4	PCB	polychlorinated biphenyl	UST	underground storage tank
LTM	long term monitoring				

3.3.6.4 PCBs

PCBs are chemicals that persist in the environment, accumulate in organisms, and concentrate in the food chain. Exposure to PCBs and their by-products have been linked to chloracne (a skin disorder), bleeding and neurological disorders, liver damage, human embryo deformation, cancer, and death. PCB items consist of any containers or equipment components that contain PCBs in a concentration equal to or greater than 50 ppm. The USEPA, under the *Toxic Substances Control Act*, regulates the removal and disposal of all PCB items. Commercial PCBs are used in electrical systems such as transformers, capacitors, and voltage regulators because they are electrically non-conductive and stable at high temperatures. Electric power transformers are located on utility poles at Keesler AFB; however, all transformers containing PCBs except one have been removed or retrofitted to be PCB-free. The remaining transformer that contains PCBs is located at Building 3101 and will continue to be retrofitted until it is replaced.

3.3.6.5 Lead-based Paint and Asbestos

LBP was commonly used in and on buildings and other structures until 1978. When in good condition, LBP does not pose a health hazard. However, when deteriorated (cracking, peeling, chipping), or damaged by renovation or maintenance activities, LBP can release lead-containing particles that pose a threat of lead contamination to the environment and a health hazard to workers and building occupants who may inhale or ingest the particles.

A basewide LBP survey of Keesler AFB buildings was completed in 1993 to ensure any threat to human health and the environment from LBP was identified. The survey indicated that LBP was widely used on buildings prior to 1980 (USAF 2005a). The Keesler AFB *LBP Management Plan* provides specific policy and guidance to identify and address LBP hazards and to protect the public from exposure to these hazards. The plan also provides guidance on proper management/disposal of material containing LBP (USAF 2004d).

Asbestos was widely used in construction/manufacturing in the past because of its insulating properties, its ability to withstand heat and chemical corrosion, and its soft, pliant nature. Friable (brittle) asbestos becomes hazardous when fibers become airborne and are inhaled. Asbestos fibers (less than 5 microns in size) may become trapped in the lungs and may lead to diseases including asbestosis, lung cancer, and mesothelioma. Only the most recently constructed buildings were constructed without the use of asbestos-containing materials (ACM). A database containing detailed ACM survey results is maintained by the 81 CES/CEV.

ACM is managed in accordance with the installation's *Asbestos Management and Operating Plan* (USAF 2004e). This plan specifies procedures for the removal, encapsulation, enclosure, and repair activities associated with ACM abatement projects and is designed to protect installation personnel and residents from exposure to airborne asbestos fibers. The installation manages asbestos in place where possible; removing it only when there is a threat to human health or the environment or when it is in the way of construction or demolition. Removal and disposal of ACM is carried out in strict compliance with all applicable federal, state, and local laws, rules, regulations, and standards (USAF 2004e).

3.3.7 Biological Resources

Biological resources are defined as vegetation, wildlife, and the habitats (including wetlands) in which they occur. The ROI for biological resources at Keesler AFB encompasses both the installation itself and the Back Bay of Biloxi. Keesler AFB is an urbanized installation, bordered by the City of Biloxi on the southern, eastern, and western sides. The Back Bay of Biloxi borders the base to the north.

The majority of Keesler AFB is developed and is occupied by roads, buildings, and runways. Open areas consist primarily of mowed lawns or semi-wooded lots between buildings. With the exception of the coastal marshes that form the northern border of the base with the Back Bay of Biloxi, Keesler AFB does not support an abundant variety of natural habitats. The Base does not support any state- or federally-protected species (USAF 2006a).

3.3.7.1 Vegetation and Wildlife

Although the existing vegetation at Keesler AFB is largely urban and suburban, a small amount of naturally vegetated areas occurs in the wetlands that border the Back Bay of Biloxi. In addition, a large number (over 8,000) of native trees occur across the base. A large number native live oaks have been designated "Heritage Trees": old large flora species set aside by the City of Biloxi and Base Commander for conservation and only removed if permanently damaged by lightning or disease.

Wildlife resources at Keesler AFB are limited to the wetland communities along the Back Bay of Biloxi, maintained open spaces, and to the urban forest habitats throughout the Base (Table 3-11).

3.3.7.2 Wetlands

Wetlands are those areas inundated or saturated by surface or groundwater at a frequency and for a duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Although no wetlands exist within the main area of the base, there are approximately 21 acres of wetlands along the northern boundary of the base (the golf course, the fire training area, and the marina), bordering the Back Bay of Biloxi. These coastal marshes are influenced by tidal and estuarine flows, and receive both monitored and unmonitored surface discharge from the following types of off-base sources: residential, commercial, industrial, and shipping (Integrated Natural Resources Management Plan in preparation). The overall management objective for this resource, as required by Section 404 of the *Clean Water Act* and the EO on Wetlands (EO 11990), is that there be "no net loss of wetlands."

Table 3-11 Wildlife Species in or near Keesler AFB

Common Name	Scientific Name
Mammals	
Gray squirrel	*Sciurus carolinensis*
Fox squirrel	*Sciurus niger*
Norway rat	*Rattus norvegicus*
Cotton rat	*Sigmodon hispidus*
Rice rat	*Oryzomys palustris*
Opossum	*Didelphis marsupialis*
Eastern cottontail rabbit	*Sylvilagus floridanus*
Raccoon	*Procyon lotor*
Swamp rabbit	*Sylvilagus aquaticus*
House mouse	*Mus musculus*
Birds	
Acadian flycatcher	*Empidonax virescens*
Pigeon	*Columba livia*
Mourning dove	*Zenaida macroura*
Grebe	*Podiceps spp.*
Barn owl	*Tyto alba*
Tree swallow	*Tachycineta bicolor*
Wood duck	*Aix sponsa*
Sandhill crane	*Grus canadensis*
Killdeer	*Charadrius vociferus*
Laughing gull	*Larus atricilla*
Gull-billed tern	*Sterna nilotica*
Royal tern	*Sterna maxima*
Great blue heron	*Ardea herodias*
Snowy egret	*Egretta thula*
Cattle egret	*Bubulcus ibis*
Double-crested cormorant	*Phalacrocorax auritus*
Common grackle	*Quiscalus quiscula*
Common loon	*Gavia immer*
Canada goose	*Branta canadensis*
Red-tailed hawk	*Buteo jamaicensis*
Northern mockingbird	*Mimus polyglottos*
House sparrow	*Passer domesticus*
Brown thrasher	*Toxostoma rufum*
Cardinal	*Cardinalis cardinalis*
Blue jay	*Cyanocitta cristata*
Reptiles	
Cottonmouth Snake	*Agkistrodon piscivorus*

Source: USAF 2001b

3.3.8 Utilities and Infrastructure

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function. Infrastructure is wholly human-made with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as "urban" or developed. The availability of infrastructure and its capacity to support growth are generally regarded as essential to economic growth of an area. As projects on Keesler AFB are conceptualized and planned, project engineers incorporate into those designs the infrastructure and utility specifications that would be required as part of the project.

3.3.8.1 Electricity and Natural Gas

Keesler AFB purchases the majority its electricity from Mississippi Power Company (MPCo) via the Gulfport Power Plant. The power is distributed by seven radial distribution feeders designed to provide normal and emergency service through the use of contingency feed points. Although supplied by a 115-kilovolt (kV) substation, the nominal system voltage at the base is reported as 23-kV. The base electrical system was refurbished in the early 1980s and again in 2001. There are 240 miles of electric lines located primarily underground. The Harrison Court family housing area is located directly east of the base, and the 23-kV system that serves the Harrison Court family housing area is fed and metered separately by MPCo. The small arms firing range is located northwest of the base and receives its power from the Coast Electric Power Association. Consumption data collected by Keesler AFB between 2003 and 2005 indicate an annual consumption between 154 million kilowatt-hours (KWh) and 161 million KWh. The corresponding peak load information estimated from the same data indicate peak loading conditions range between 26,991 kilovolt-amps (KVA) and 23,326 KVA (Appendix B).

Center Point Energy supplies natural gas to Keesler AFB. A single 8-inch high-pressure pipeline runs 12 miles from Gulfport, Mississippi, to the main base. The gas main passes through two different measuring and regulator/valve stations on the west side of the City of Biloxi to enter the Thrower Park family housing area and the main base. The majority of the 12 miles of 8-inch gas main is located on private property within a 30-foot easement. There are approximately 400,000 linear feet (or about 80 miles) of gas lines in the base distribution system. Over 95 percent of the base's gas mains are steel. In some areas where it has been necessary to replace existing due to new construction or repair, polyethylene replacement pipe has been installed (Appendix B).

Annual consumption data collected between 2003 and 2005 indicate an annual consumption between 446,565,000 cubic feet and 408,445,000 cubic feet. The corresponding peak load information estimated from the same data indicate a peak loading condition of 1,862,000 cubic feet per day, which corresponds to an estimated average hourly consumption rate of 78,583 cubic feet per hour. The contract limitations on the natural gas supply are 225,000 cubic feet per hour, 5,400,000 cubic feet per day, and 550,000,000 cubic feet per year. Additional information can be found in Appendix B.

3.3.8.2 Potable Water

Keesler AFB maintains its own potable water system (USEPA PWS Number 0240049) which supplies water from two aquifers (the Lower Graham Ferry and Upper Pascagoula located in the Miocene system) to the base and to one off-base customer (VA Gulf Coast Veterans Health Care System hospital). Currently, the Keesler AFB system includes a network of 14 water supply wells with production capacities that range from 400 gallons per minute (gpm) to 1,000 gpm (however, some are inoperable), six elevated storage tanks comprising 2.4 million gallons of storage, two 50,000-gallon fire suppression system water storage tanks, and more than 41 miles of distribution mains containing common water system appurtenances (Appendix B).

All base supply wells are individually permitted with the State of Mississippi, which regulates their productive use. The currently permitted combined production capability for all operable wells is 9.2 million gallons per day (mgd). The base voluntarily restricts water production to a 16-hour daily pumping schedule to allow for recharge within the aquifers and to reduce wear on the well infrastructure. The resulting average daily water supply production is 6.1 mgd (Appendix B).

Potable water consumption in 2004 averaged approximately 2.33 mgd; the estimated maximum daily consumption was 2.4 mgd during October 2003. More recent data from 2005 recorded an estimated maximum daily consumption of 2.7 mgd (based on data reported in August 2005). Historical peak flows reported between 2001 and 2003 ranged from 5.2 mgd to 3.6 mgd. Additional information can be found in Appendix B.

3.3.8.3 Solid Waste Management

Solid wastes are regulated under the Solid Waste Disposal Act (42 United States Code [USC] 3251 et seq.) and RCRA. AFI 32-7042 requires that each installation have a solid waste management program that includes a solid waste management plan that addresses the handling, storage, collection, disposal, and reporting of solid waste. State requirements are covered under Mississippi Regulation SW-2, *Non-hazardous Solid Waste Management Regulations and Criteria*.

Solid waste generated at Keesler AFB is collected by a service contractor (Selrico Services, Inc.) and disposed of at the Pecan Grove Municipal Landfill, located in Pass Christian, Mississippi. Recycling services (mixed paper, steel/aluminum cans, glass, plastics, and cardboard) are performed by the installation under the Qualified Recycling Program. Recyclable materials are collected curbside each week and transported to the installation recycling center (Facility 4004) where they are sorted, baled, and stored until they can be transported to an approved recycler (USAF 2004a). Construction and demolition (C&D) waste from the base that requires disposal is transported to the Coastal Recycling Rubbish Site located in north Harrison County. Non-construction/demolition debris or municipal solid waste generated at Keesler AFB is collected by a service contractor and disposed of at the Pecan Grove Municipal Landfill. Annual totals for C&D and municipal solid waste debris generated at Keesler AFB prior to Hurricane Katrina are provided in Table 3-12, and Table 3-13 summarizes the solid waste debris facilities that receive waste from Keesler AFB. Although these facilities also accept C&D debris, specific information regarding the amounts of C&D debris accepted at these sites from Keesler AFB is unavailable.

Hurricane Katrina caused catastrophic damage to Mississippi's coast in August 2005. This storm wrought massive destruction of personal and public property resulting in an increase in the amount of C&D debris generated in 2005. As a result of Hurricane Katrina, the life expectancy of the Pecan Grove landfill was reduced from 40 years in 2004 to 28 years in 2005. There was a 36 percent increase in the annual amount of waste received for Pecan Grove Landfill due to C&D debris generated from Hurricane Katrina.

3.3.8.4 Wastewater

Keesler AFB discharges its wastewater to two separate Harrison County wastewater treatment facilities operated by the City of Biloxi. With the exception of the Harrison Court Housing Area, Keesler AFB pumps its wastewater to the Harrison County West Biloxi Sewage Treatment Plant. The Harrison Court Housing Area discharges by gravity flow to the Keegan Bayou Plant. The Keesler AFB wastewater collection system is comprised of more than 400,000 linear feet of sewer mains. Sewer line materials are primarily ductile iron and polyvinyl chloride. The Keesler AFB wastewater collection system can accommodate a wastewater flow of approximately 3.24 mgd (Appendix B).

Based on data collected between 2003 and 2005, the estimated total annual wastewater generation ranges between 712 million gallons and 794 million gallons, or between 1.95 and 2.17 mgd of average daily wastewater flow. The West Biloxi Sewage Treatment Plant (National Pollutant Discharge Elimination System Permit [NPDES] MS0030333) provides secondary treatment of wastewater and is permitted to process 9.1 mgd during the months of June through October, and 11 mgd for November through May. Effluent from the West Biloxi Sewage Treatment Plant is discharged to the Back Bay of Biloxi. Keesler AFB wastewater flows account for approximately 20 to 30 percent of the permitted average daily plant flow. Although the utility service contract for the West Biloxi plant does not specifically limit the maximum daily flow rate, it does place a limit of 822,430,000 gallons per year on the annual discharge, which averages to a daily flow rate of 2.25 mgd. The Keegan Bayou Plant contractually limits the base wastewater effluent from the Harrison Court housing area to 17,762,000 gallons per year, which averages to a daily rate of 0.05 mgd. Additional information can be found in Appendix B.

Table 3-12 Solid Waste Generated/Recycled at Keesler AFB during Calendar Year 2005

Waste Type	Waste Generated/Recycled (tons)
Solid Waste Landfilled	8,246.6
Solid Waste Composted	537.6
Construction and Demolition Waste Landfilled	471.9
Total Generated (tons)	**9,274.1**
Solid Waste Recycled	2,480.9
Construction and Demolition Waste Recycled	1,576.3
Total Recycled (tons)	**4,057.2**

Source: USAF 2006c

Table 3-13 Landfills Accepting Keesler AFB Waste

Facility	Owner/Operator	Permitted Acreage	2005 Waste Received (tons/year)	2005 Waste Received (tons/day)	Landfill Life Expectancy
Pecan Grove Landfill	Waste Management of Mississippi, Inc.	176	407,128	1,313	28 years
Coastal Recycling Rubbish Site	C.N. Williams, Inc.	60	151,094	487.4	Approximately 11 years[1] (42 acres)
Blackmer Disposal Facility (Class 1 Rubbish Site)	Mark Blackmer	15	104,803	338.1	6 years
Blackmer Disposal Facility (Class II Rubbish Site	Mark Blackmer	23.5	7,321	23.6	10 years

Note:

Tons per day calculated using 310 days/year.

[1]Life expectancy is provided by each Waste Management Facility to the state of Mississippi. The state of Mississippi allows the values to be recorded as time remaining or as volume remaining at the waste facility.

Coastal Recycling Rubbish Site reported a life expectancy of 42 acres. Assuming that the site is on average 20 feet deep, the volume equals 1,355,200 cubic yards.

One square foot of construction and demolition debris equals approximately 0.046 tons per US Environmental Protection Agency standards. That is equivalent to 151,094 tons of waste from 2005 or 3,284,652 square feet of construction and demolition debris, which represents approximately 121,532 square yards of construction and demolition debris disposed of per year.

With these assumptions, it should take 11 years to fill the Coastal Rubbish Recycling Site if the volume of waste received each year remains the same as in 2005.

Source: MDEQ 2005a

3.3.8.5 Transportation

Keesler AFB is located within the Biloxi city limits. The main east-west arterial on the Biloxi Peninsula, US Highway 90, parallels the southern border of the installation and provides access to IH-10 by US Highway 49 and IH-110.

The road network at Keesler AFB consists of approximately 146 miles of roadways (Figure 3-4). The majority of the road system is asphalt with curb and gutter systems. However, a few areas of the base do not have a curb and gutter system in place. When these unimproved areas are repaired, curbs, gutters, and sidewalks are usually installed to improve pavement performance, drainage runoff, and pedestrian traffic. Although the majority of the roads on Keesler AFB are in good condition, heavy construction activity and replacement of the overhead electrical system has decreased pavement condition in several areas of the base (USAF 2004a).

The eastern access points to the base consist of Gate 1 (Meadows Gate) and Gate 2 (Judge Sekul Gate). Gate 3 (Larcher Gate) provides access to the south part of the base, while Gate 7 (Pass Gate) is the west gate. The Meadows, Larcher, and Pass Gates are open 24 hours a day, seven days a week, while the Judge Sekul Gate is only open from 5:30 a.m. to 6:00 p.m. on duty days. Gate vehicular traffic volumes for the weekday, morning, and afternoon peak hours were collected in April 2002 and July 2003 (morning peak hour at Gate 2) (USAF 2004a). The traffic counts indicate that the majority of the morning traffic enters Keesler AFB through Gate 2 and Gate 1, followed by Gate 7. Evening traffic exiting the base generally follows the same pattern.

Motorists accessing the base from the east predominately use IH-110. Meadows Gate traffic travels along Bayview Avenue and Forest Avenue. Bayview Avenue is a collector road for the residential developments along the Back Bay and Forest Avenue is a local residential street. Judge Sekul Gate is located at the end of Judge Sekul Avenue, which serves a mixture of retail, commercial, and high and low density housing. Access to this gate is either from the east via IH-110 to Division Street to Forest Avenue, or from the south using US 90 and Porter Avenue. Larcher Gate, at the southeast perimeter of the base, is currently the location of the existing Visitor's Center. Access to this gate is primarily off US Highway 90; a small volume of traffic uses Irish Hills Drive. Motorists accessing the base from the west enter Pass Gate from Pass Road or Iberville Drive from US Highway 90.

The primary roads on Keesler AFB are Larcher Boulevard, Ploesti Drive, and Meadows Drive. Larcher Boulevard connects the main gate with the medical center. Ploesti Drive is a primary road carrying traffic from off-base areas to the west. Meadows Drive leads from the Meadows Gate. General Chappie James Avenue, although configured as a secondary road, has become a major thoroughfare. It transects the base in a northwest to southeast orientation and is the shortest route between the main gate and the headquarters and training facilities (USAF 2004a).

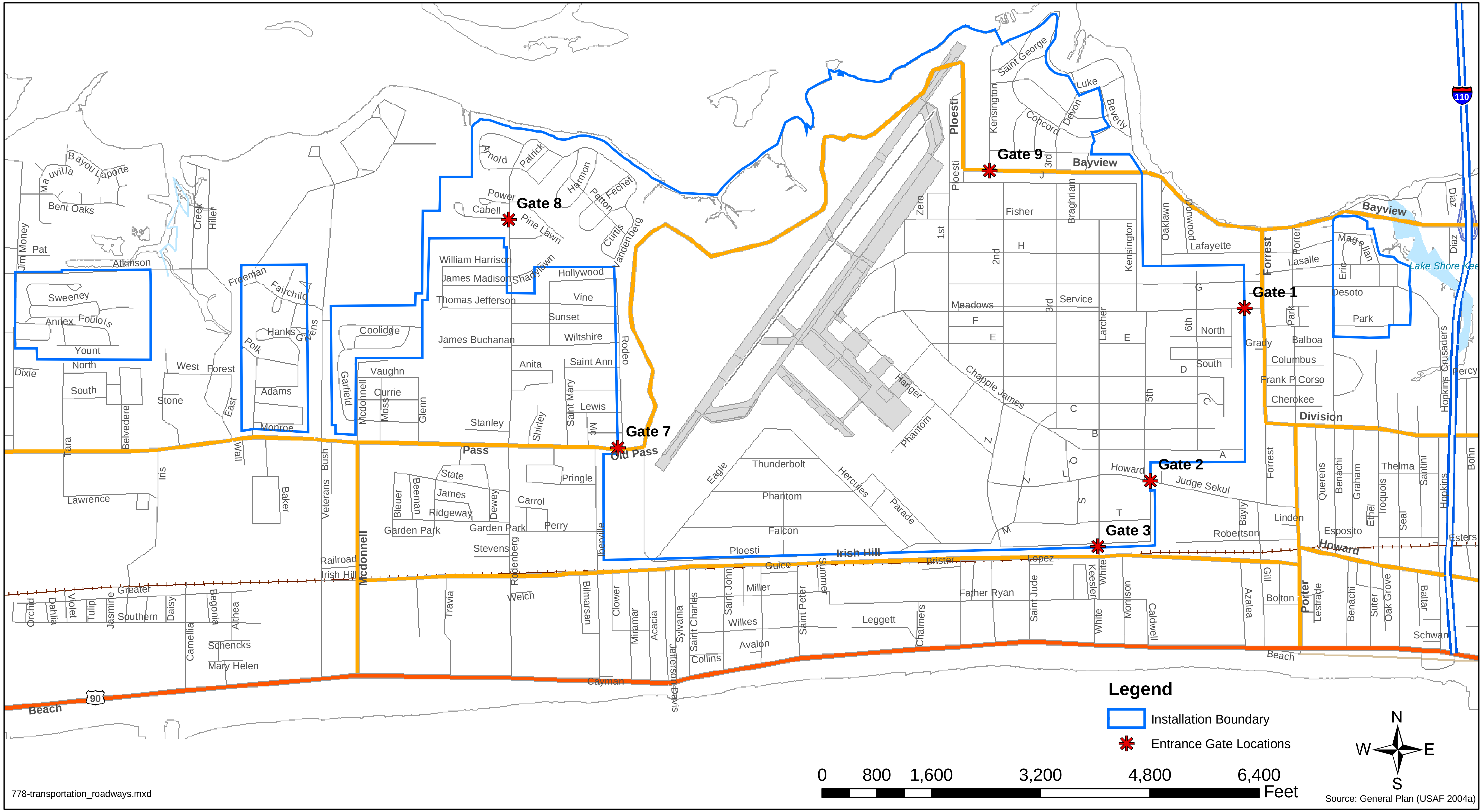

Figure 3-4 Transportation System, Keesler Air Force Base, Mississippi

The Keesler AFB housing areas consist of arterial roadways with minimal side-street parking. Each housing area can be accessed from a number of roadways. Parking on base is a problem in some areas with the most congestion occurring around the medical center. The base is eliminating on-street parking and improving the appearance and arrangement of off-street parking areas.

Presently, Keesler AFB has several road network problems. The east part of the main base reflects the street grid that served small, temporary structures built during World War II. Roads in the west part of the base are oriented to the angles of the present runway and the abandoned crosswind runway. Where these two geometries meet, mostly along General Chappie James Avenue, there are awkward street intersections. The current street grid layout of small blocks limits the development of large buildings or complexes of buildings. In addition, the large number of intersections and the lack of a clear street layout create traffic control problems.

Safety and traffic concerns also exist at Larcher Gate. The first is the limited queuing distance motorists have while entering the gate due to the close proximity of the CSX railroad tracks and Irish Hills Drive. The second is the location of M Street with respect to the gatehouse. M Street is a primary road and is actually an extension of Ploesti Drive to the west. There is only 100 feet between the gatehouse and the point at which M Street ties into Larcher Boulevard. This separation distance is too short and it causes problems for left turning vehicles on both M Street and Larcher Boulevard.

3.3.8.6 Stormwater Drainage

Stormwater systems convey precipitation away from developed sites to appropriate receiving surface waters through a series of underground stormwater lines, culverts, and drainage ditches into the Back Bay of Biloxi and small bayous associated with the bay. The stormwater systems employ a variety of devices to slow the movement of water, thus reducing sediments and other contaminants that could otherwise flow directly into surface waters. The stormwater drainage system at Keesler AFB consists of open channels and covered drainage culverts. The system is divided into 30 discrete storm sewer basins. Most of the basins discharge to the Back Bay of Biloxi, Bayou LaPorte, or Keegan Bayou, but 9 percent of base drainage is routed to the City of Biloxi's stormwater collection system. The main base has nearly 500,000 linear feet of concrete storm drainage pipe.

3.3.9 Socioeconomics and Environmental Justice

Socioeconomic resources are defined as the basic attributes associated with the human environment, generally including factors associated with population, housing, education, and the economy. Direct impacts to any of these factors may generate secondary effects on other factors, resulting in a series of potential socioeconomic ramifications within the affected area.

Concern that certain disadvantaged communities may bear a disproportionate share of adverse health and environmental effects compared to the general population led to the enactment in 1994 of EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. This executive order directs federal agencies to address disproportionate environmental and human health effects in minority and low-income communities. EO 13045, Protection of Children from Environmental Health Risks and Safety Risks, was enacted in 1997, directing federal agencies to identify and assess environmental health and safety risks to children, coordinate research priorities on children's health, and ensure that their standards take into account special risks to children.

The ROI for socioeconomics and environmental justice encompasses the Biloxi-Gulfport-Pascagoula Metropolitan Statistical Area (MSA), which includes Hancock, Harrison, and Jackson counties in Mississippi. These three counties encompass 1,785 square miles of land area and comprise the entire coastline of Mississippi along the Gulf of Mexico.

In August 2005, Hurricane Katrina caused extensive damage to the area, destroying the majority of buildings along the Mississippi coastline and prompting a significant evacuation of the region.

3.3.9.1 Population

Prior to Hurricane Katrina, the Biloxi-Gulfport-Pascagoula MSA had experienced steady population growth since 1990, increasing at a rate exceeding that of the state of Mississippi. The population of the MSA increased by 16.5 percent between 1990 and 2000, and had a 2005 estimated population of 376,461 persons. By comparison, the population of the State of Mississippi increased by 10.5 percent during the prior decade, reaching a 2005 population of 2,921,088 persons (US Census Bureau 2006a, b, and c). The City of Biloxi had an estimated 2005 population of 50,209 persons, comprising 13.3 percent of the MSA population. It is estimated that in the aftermath of Hurricane Katrina, the MSA has lost about 20 percent of its population, second only to New Orleans in terms of population loss (Frey and Singer 2006).

Table 3-14 identifies total population and percentage disadvantaged and youth populations in the City of Biloxi, the three counties comprising the Biloxi-Gulfport-Pascagoula MSA, the State of Mississippi, and the United States. The proportion of minority residents in the region associated with the proposed action and alternatives is lower than for the state overall. Minority persons range from 11.6 percent of the population in Hancock County to 29.8 percent in Harrison County, and comprise 30.3 percent of the City of Biloxi population. In the State of Mississippi, minorities comprise 40.1 percent of the population. Black persons are by far the predominant minority group in each jurisdiction.

Table 3-14 Total Population and Populations of Concern

	Total Population	Percent Minority	Percent Low-Income	Percent Youth
City of Biloxi[1]	50,644	30.3%	14.6%	24.2%
Hancock County	46,711	11.6%	15.7%	23.4%
Harrison County	193,810	29.8%	16.5%	25.7%
Jackson County	135,940	27.6%	15.0%	25.8%
Biloxi MSA	376,461	26.7%	15.9%	25.5%
State of Mississippi	2,921,088	40.1%	19.9%	25.8%
United States	281,421,906	30.9%	12.4%	25.7%

% percent

[1]Data for City of Biloxi is from year 2000. All other areas are for year 2005.

Source: US Bureau of the Census 2000 and US Bureau of the Census 2006 a through d

The incidence of poverty in the affected region is somewhat below the state average, which is 19.9 percent. Individuals living below the poverty level account for 14.6 percent of the population in Biloxi, and between 15.0 percent and 16.5 percent in the three ROI counties. The demographic data indicate that minority and low-income groups do not represent a disproportionate number of the ROI population.

The youth population, comprised of children under the age of 18 years, is relatively consistent throughout the region, with no known concentrated areas of concern where youth might experience special health or safety risks. Children constitute 25.5 percent of the population in the Biloxi-Pascagoula-Gulfport MSA overall, very comparable to the state youth population of 15.8 percent.

The baseline population associated with Keesler AFB, based on FY2004 data, is 22,907 persons: 6,182 active duty military personnel, 4,476 students (average population), 7,034 resident military dependents, 3,849 civilian personnel, and 1,366 transient personnel (see Table 3-15). The baseline population in this section differs from the baseline figures presented in Section 2.6.1 in that the socioeconomic analysis includes off-base resident military dependents. An estimated 45 percent of the Keesler AFB population resides on base, including 6,522 active duty military personnel and 2,328 military dependents. The remaining 55 percent reside off base: 7,985 active duty military and civilian personnel and 4,706 military dependents. The base population constitutes 45.2 percent and 6.1 percent of the City of Biloxi and Biloxi-Gulfport-Pascagoula MSA populations, respectively.

Table 3-15 Keesler AFB Baseline Population (FY2004)

	Living On Base	Living Off Base	Total
Military Personnel	2,046	4,136	6,182
Student Personnel	4,476	0	4,476
Military Dependents	2,328	4,706	7,034
Civilian Personnel	0	3,849	3,849
Transient Personnel	1,366	0	1,366
Total Baseline Population	**10,216**	**12,691**	**22,907**

Source: see Appendix B

3.3.9.2 Housing

According to the Census, there were a total of 165,100 housing units in the Biloxi-Gulfport-Pascagoula MSA in 2004. The vacancy rate was 10.7 percent, and the homeownership rate was 68.9 percent. There were 136,111 households in Pulaski County, yielding an average household size of 2.60 persons, compared to 2.63 for the state (US Census Bureau 2006a, b, c, and d). The City of Biloxi had 22,115 housing units, of which 11.4 percent were vacant and 48.9 were owner-occupied. There were 19,588 households in Biloxi, with an average household size of 2.42 persons. Hurricane damage to housing along Mississippi's coastal region is estimated to have been 300,000 units (Holtz-Eakin 2005). In Harrison County alone, in which the City of Biloxi is situated, 25 percent of all housing requires rebuilding (Murray 2005).

Prior to Hurricane Katrina, the Military Family Housing (MFH) inventory at Keesler AFB included 1,820 units (USAF 2006a). Plans to demolish all base housing and rebuild 1,067 MFH units west of the base will result in a net loss of 753 units. Unaccompanied housing at Keesler AFB included 1,404 permanent party dormitory rooms, which will be replaced by 672 units, resulting in a net loss of 742 units (Appendix B). There are presently 1,839 non-prior service (NPS) dormitory units in various states of use. The final planned number of NPS dormitory units is 2,099, with a total 4,198 beds. There are 336 Visiting Officers' Quarters units, 836 Visiting Airmens's Quarter units, 480 Visiting Quarters (VQ) units, and 50 temporary lodging facilities units on base. Plans include the addition of 320 units of VQ lodging (Appendix B).

3.3.9.3 Education

There are five school districts in Harrison County with an estimated enrollment in 2004-2005 of 30,941 students (see Table 3-16). The Biloxi Public School District services the elementary and secondary school students of military personnel living on base. In the fall semester of the 2004-2005 academic year, the Biloxi Public School District had 6,305 students and 446 teachers, resulting in a student-to-teacher ratio of 13:1 (Mississippi Department of Education [MDE] 2006a).

Table 3-16 Harrison County Public School Enrollment (2004-2005)

	Enrollment	Teachers	Student-Teacher Ratio
Harrison County School District	13,108	754	17.4
Biloxi Public School District	6,305	446	14.1
Gulfport School District	6,291	461	13.6
Long Beach School District	3,257	214	15.2
Pass Christian Public School District	1,980	135	14.7
Total	**30,941**	**2,010**	**15.4**

Source: MDE 2006a and b

Of the 6,100 students enrolled in the Biloxi Public School District prior to Hurricane Katrina, roughly 3,200 remained when classes resumed in September 2005. Enrollment currently stands at 4,500 students and is expected to increase as recovery efforts in hurricane-affected regions continue (City of Biloxi 2006b).

3.3.9.4 Economy

The civilian labor force in the Biloxi-Gulfport-Pascagoula MSA included 176,928 persons in 2000, of which 155,970 were employed (US Census Bureau 2000). The unemployment rate in 2000 was 6.4 percent, climbing to 12.5 percent as of June 2006 (US Bureau of Labor Statistics 2006). Median household income was $36,662 and persons below the poverty level represented 13.9 percent of the population. The civilian labor force in the City of Biloxi included 21,793 persons, of whom 20,366 were employed.

Primary industries in the Biloxi region include tourism/recreation, seafood, and government enterprises. The casino gaming industry, in particular, has experienced substantial growth in the past decade. However, the effects of Hurricane Katrina on the gaming sector are likely to be significant and long lasting. At least eight casinos are considered to be total losses and have closed permanently, while four others suffering significant damage may be rebuilt (Murray 2005). Other major employers in the region include Keesler AFB, Northrop Grumman Ship Systems, Stennis Space Center, Naval Construction Battalion Center, and a number of healthcare facilities.

The federal government—the military in particular—provides a substantial portion of employment and economic activity in the region. The Mississippi Military Communities Council (MMCC) estimates that Keesler AFB supports a total 16,913 jobs, including indirect jobs, and total $510 million in annual payroll (MMCC 2006). Contracts for services and purchases of supplies and equipment amount to $213 million annually (USAF 2004f). The total annual economic impact generated by Keesler AFB activities is estimated at $723 million.

3.3.10 Air Quality

This section discusses air quality considerations and conditions in the area around Keesler AFB, Mississippi. It addresses air quality standards and describes current air quality conditions in the region.

3.3.10.1 Definition of the Resource

3.3.10.1.1 Federal Air Quality Standards

Air quality in a given location is described by the concentration of various pollutants in the atmosphere, generally expressed in units of ppm or micrograms per cubic meter ($\mu g/m^3$). Air quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. The significance of a pollutant concentration is determined by comparing it to federal and state ambient air quality standards. These standards represent the maximum allowable atmospheric concentration that may occur and still protect public health and welfare, with a reasonable margin of safety. The national ambient air quality standards (NAAQS) are established by the USEPA.

In order to protect public health and welfare, the USEPA has developed numerical concentration-based standards or NAAQS for six "criteria" pollutants (based on health related criteria) under the provisions of the *Clean Air Act* (CAA) (CAA Amendments of 1970). There are two kinds of NAAQS: primary and secondary standards. Primary standards prescribe the maximum permissible concentration in the ambient air to protect public health including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards prescribe the maximum concentration or level of air quality required to protect public welfare including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

National ambient air quality standards have been established for: (1) ozone (O_3), (2) nitrogen dioxide, (3) carbon monoxide (CO), (4) sulfur oxides (measured in terms of sulfur dioxide [SO_2]), (5) lead, and (6) particulate matter. Particulate matter standards incorporate two particulate classes: (1) particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}) and (2) and particulate matter with an aerodynamic diameter less than or equal to 2.5 microns. The NAAQS are the cornerstone of the CAA. Although not directly enforceable, they are the benchmark for the establishment of emission limitations by the states for the pollutants that USEPA determines may endanger public health or welfare. The federal national ambient air quality standards are presented in Table 3-17.

Ozone (ground-level O_3), a major component of "smog," is not directly emitted into the atmosphere but is formed in the atmosphere through the reactions of previously emitted pollutants or precursors (volatile organic compounds [VOC] and nitrogen oxides [NO_X]) in the presence of sunlight. Large spatial and temporal separation can exist between the emission sources of VOCs and NO_X and the formation of O_3. Since VOCs and NO_X participate in atmospheric photochemical reactions that produce O_3, the attempt is made to control O_3 through the control of VOCs and NO_X. For this reason, VOCs and NO_X emissions are calculated and reported in emissions inventories.

The fundamental method by which the USEPA tracks compliance with the NAAQS is the designation of a particular region as "attainment," "nonattainment," or "unclassifiable." Areas meeting or having better air quality than the NAAQS are said to be in attainment. Areas that exceed the NAAQS are said to be in nonattainment. Areas that cannot be classified on the basis of available information as attainment or nonattainment are defined as unclassifiable and are treated as attainment areas. Attainment areas can be further classified as maintenance areas. Maintenance areas are areas that were previously nonattainment but have reduced pollutant concentrations below the standard and must maintain some of the nonattainment area plans to stay in compliance.

Table 3-17 National Ambient Air Quality Standards

Pollutant	Primary Standards	Averaging Times	Secondary Standards
Carbon Monoxide (CO)	9 ppm (10 mg/m^3)	8-hour[1]	None
	35 ppm (40 mg/m^3)	1-hour[1]	None
Lead (Pb)	1.5 µg/m^3	Quarterly Average	Same as Primary
Nitrogen Dioxide (NO_X)	0.053 ppm (100 µg/m^3)	Annual (arithmetic mean)	Same as Primary
Particulate Matter (PM_{10})	Revoked[2]	Annual[3] (arithmetic mean)	Same as Primary
	150 µg/m^3	24-hour[1]	
Particulate Matter ($PM_{2.5}$)	15.0 µg/m^3	Annual[4] (arithmetic mean)	Same as Primary
	35 µg/m^3	24-hour[5]	
Ozone (O_3)	0.08 ppm	8-hour[6]	Same as Primary
	0.12 ppm	1-hour[7] (applies in limited areas)	Same as Primary
Sulfur Oxides (SO_X)	0.03	Annual (arithmetic mean)	
	0.14	24-hour[1]	
	------	3-hour[1]	0.5 ppm (1,300 µg/m^3)

mg/m^3 milligrams per cubic meter µg/m^3 micrograms per cubic meter ppm parts per million
[1]Not to be exceeded more than once per year.
[2]Due to lack of evidence linking health problems to long-term exposure to coarse particulate pollution, the annual PM_{10} standard was revoked in 2006.
[3]To attain this standard, the 3-year average of the weighted annual mean PM_{10} concentration at each monitor within an area must not exceed 50 µg/m^3.
[4]To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3.
[5]To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m^3.
[6]To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
[7](a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is < 1, as determined by appendix H.
(b) As of June 15, 2005, USEPA revoked the 1-hour ozone standard in all areas except the fourteen 8-hour ozone nonattainment Early Action Compact Areas. The one-hour standard does not apply in Mississippi.
Source: 40 CFR 50

State Air Quality Standards

The CAA gives states the authority to establish air quality rules and regulations. These rules and regulations must be equivalent to, or more stringent than, the federal program. The MDEQ has adopted the primary and secondary NAAQS as duly promulgated by the USEPA.

State Implementation Plan

The states have primary responsibility to implement the CAA; the primary vehicle for this implementation is the State Implementation Plan (SIP). Each state is required to develop a SIP that sets forth how CAA provisions will be imposed within the state.

The MDEQ is required by federal law to maintain a federally approved SIP for attaining and maintaining NAAQS and meeting the provisions of federal law. The SIP is a compilation of new and previously submitted plans, programs (such as monitoring, modeling, permitting, etc.), district rules, state regulations, and federal controls. MDEQ has a federally approved SIP and it is embodied in the following air regulations:

- APC-S-1 (Air Emission Regulations for the Prevention, Abatement, and Control of Air Contaminants)
- APC-S-2 (Permit Regulations for the Construction and/or Operation of Air Emission Equipment)
- APC-S-3 (Regulations for Prevention of Air Pollution Emergency Episodes)
- APC-S-5 (Regulations for the Prevention of Significant Deterioration of Air Quality)

There are no specific SIP issues that would impact the proposed actions. As stated in the text, responsible organizations should use (1) BMPs to reduce fugitive emissions from demolition/construction activities and (2) efficient use of equipment and regular vehicle maintenance to reduce combustion emissions.

Prevention of Significant Deterioration

Section 160 of the CAA establishes the prevention of significant deterioration (PSD) program. PSD applies to new major sources or major modifications at existing sources for pollutants where the area the source is located in is in attainment or unclassifiable with the NAAQS. Major sources are defined as any stationary pollutant source with potential to emit more than 100 tons per year. In PSD areas, the cutoff level may be either 100 or 250 tons, depending upon the type of source. A major modification is a modification of a major stationary source of emissions with respect to PSD.

The goal of the program is to: (1) protect public health and welfare from any adverse effects which might occur even at pollutant levels better than the NAAQS; (2) insure economic growth while preserving existing air quality; (3) preserve, protect, and enhance the air quality in areas of special natural recreational, scenic, or historic value, such as national parks and wilderness areas; and (4) assure that emissions from any source in a state will not interfere with any portion of the applicable SIP to prevent significant deterioration of air quality. Sources subject to PSD review are required by the CAA to obtain a permit before commencing construction. The permit process requires an extensive review of all other major sources within a 50-mile radius and of all Class I areas within a 62-mile radius of the facility. Emissions from any new or modified source must be controlled using Best Available Control Technology (an emissions limitation that is based on the maximum degree of control that can be achieved).

Section 162 of the CAA further established the goal of PSD of air quality in all international parks; national parks that exceeded 6,000 acres; and national wilderness areas and memorial parks that exceeded 5,000 acres if these areas were in existence on August 7, 1977. These areas were defined as mandatory Class I areas, while all other attainment or unclassifiable areas were defined as Class II areas. National parks and wilderness areas are designated as Class I areas, where any appreciable deterioration in air quality is considered significant. Class II areas are those where moderate, well-controlled industrial growth could be permitted. Class III areas allow for greater industrial development. Currently there are no designated Class III areas in the United States. There are no Class I areas in the State of Mississippi. All areas within the state are Class II areas.

Visibility

The national visibility goal was established in section 169A of the 1977 CAA as "the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I areas which impairment results from manmade air pollution." There are 156 mandatory Federal Class I areas identified for visibility protection under this provision. The term visibility refers to the clarity with which scenic vistas and landscape features are perceived at great distances. Visibility impairment, quantified as light extinction, is caused by the scattering and absorption of light by particles and gases in the atmosphere. Without the effects of human-caused air pollution, a natural visual range is estimated to be about 140 miles in the western US and 90 miles in the eastern US (USEPA 2001).

Under the 1990 CAA Amendments, the USEPA promulgated the Regional Haze Rule to protect visibility in the 156 mandatory Federal Class I areas (Regional Haze Regulations, Final Rule, 1999). The rule requires the states, in coordination with the Environmental Protection Agency, the National Park Service, US Fish and Wildlife Service, the US Forest Service, and other interested parties, to develop and implement air quality protection plans to reduce the pollution that causes visibility impairment. Emission levels are used to qualitatively assess potential impairment to visibility in PSD Class I areas. Decreased visibility may potentially result from elevated concentrations of PM_{10} and SO_2 in the lower atmosphere. As stated in the previous discussion of PSD, there are no Class I areas in the State of Mississippi.

3.3.10.1.2 General Conformity

The DoD, like all federal agencies, is subject to the general conformity determination as specified in Section 176(c) of the CAA, codified at 42 USC § 7506(c). The conformity determination is made in accordance with USEPA's final rule, *Determining Conformity of General Federal Actions to State or Federal Implementation Plan*, as published in the Federal Register on November 30, 1993 and codified at 40 CFR 51 Subpart W. The specific purpose of Section 176(c) is to make emissions from federal activities consistent with the air quality planning goals of the CAA. The conformity rule applies only in those air basins or parts of air basins designated as nonattainment for one or more of the NAAQS or attainment areas subject to maintenance plans (maintenance area). A maintenance plan establishes measures and procedures to control emissions to ensure that the air quality standard is maintained in areas that have been redesignated from a previous nonattainment status to attainment. Federal actions occurring in areas that are in attainment with the NAAQS are not subject to the conformity rule.

Conformity, as determined under the general conformity rule, prohibits a federal agency from implementing, approving, or supporting any activity that fails to conform to an approved SIP or USEPA-promulgated Federal Implementation Plan (FIP). The statute provides that conforming to a SIP or FIP means that the activity will not:

- Cause or contribute to any new violation of the NAAQS for any criteria air pollutant.
- Increase the frequency or severity of any existing violation of any standard in the area.
- Delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

The intent of the conformity rule is to encourage long range planning by evaluating the air quality impacts from federal actions before the project are undertaken. If the emissions from a federal action proposed in a nonattainment area exceed annual thresholds identified in the rule, a conformity determination is required for that action. The thresholds become more restrictive as the severity of the nonattainment status of the region increases.

Keesler AFB is not subject to the General Conformity Rule since it is located in an attainment area.

3.3.10.1.3 Stationary Source Operating Permits

Permits are legal documents that the source must follow. They specify what construction is allowed, what emission limits must be met, and often how the source must be operated. They may contain conditions to make sure that the source is built to match parameters in the application that the permit agency relied on in their analysis. For example, the permit may specify stack heights that the permit agency used in their analysis of the source. Some limits in the permit may be there at the request of the source to keep them out of other requirements. To assure that sources follow the permit requirements, permits also contain monitoring, recordkeeping, and reporting requirements.

The operating permit program (Title V permit, often called part 70 permits because the regulations that establish minimum standards for state permit programs are found in the *Code of Federal Regulations* at 40 CFR part 70) requires that major industrial sources and certain other sources obtain a permit that consolidates all of the applicable requirements for the facility into one document. The purpose of title V permits is to reduce violations of air pollution laws and improve enforcement of those laws. Operating permits are legally enforceable documents that permitting authorities (USEPA, state, local) issue to air pollution sources after the source has begun to operate. Major is a term used to determine the applicability of permitting regulations to specific sources. What constitutes a major source varies according to what type of permit is involved, the pollutant(s) being emitted, and the attainment designation of the area where the source is located. In general, a source is major if its emissions exceed certain thresholds that are defined in terms of tons per year. For example, under Title V of the CAA, any source that emits or has the potential to emit 100 tons per year or more of any criteria air pollutant, 25 tons per year total hazardous air pollutants (HAP), or 10 tons per year of any individual HAP is a major source and must obtain a Title V operating permit.

The Environmental Permits Division within MDEQ implements and oversees the operating permitting program through the Mississippi Commission on Environmental Quality Rules APC-S-2 and APC-S-6.

Due to the variety and number of stationary emissions sources (boilers, emergency generators, surface coating operations, fuel storage/transfer facilities, etc.) on Keesler AFB, the base is classified as a major source and, therefore, operates under a Title V operating permit.

3.3.10.2 Existing Conditions

3.3.10.2.1 Climate

Mississippi is located in the humid subtropical climate region, characterized by temperate winters; long, hot summers; and rainfall that is fairly evenly distributed through the year. Prevailing southerly winds provide moisture for high humidities and potential discomfort from May through September. Locally violent and destructive thunderstorms are a threat on an average of about 60 days each year. Eight hurricanes have struck Mississippi's coast since 1895, and tornadoes are a particular danger, especially during the spring season (Mississippi State Climatologist 2006).

Keesler AFB is located along the Gulf Coast and exhibits the subtropical characteristics of that region. Winters are mild and moist; summers hot and wet. The Gulf of Mexico is the primary moisture source and moderating influence. Keesler AFB does not experience the great temperature extremes of the interior because of its coastal location but does experience the heavy precipitation common to the area. Severe weather commonly takes the form of heavy thunderstorms with damaging winds or tropical disturbances. Large hail and tornado outbreaks are usually confined to the interior. Reports of waterspouts and tornadoes will occasionally be made throughout the year. In the winter, freezing precipitation and hard freezes are much more frequent inland than at Keesler AFB.

The climate of the region is subtropical, with mild winters and warm, moist summers. Average temperatures range from 51 degrees in the winter to 83 degrees in the summer. Average annual precipitation is 62 inches, with July being the wettest month with 7 inches and October the driest with 2.5 inches. Winds are predominantly from the north during the fall and winter, and from the south during the spring and summer. Wind velocity at Keesler AFB averages 8 miles per hour (Swetland 2006).

Wind direction helps to locate a single source or multi-source area affecting a specific location. From an air pollution perspective, low wind speeds are conducive to poor pollutant dilution and are therefore associated with higher ambient pollutant concentrations. During stable atmospheric conditions, the wind is often light or calm. When stable conditions persist, the natural ambient conditions that effectively disperse pollutants are suppressed and ambient pollutant concentrations are higher near sources or source areas.

The characteristic patterns of local air movement in the Keesler AFB area are illustrated by the annual wind rose shown in Figure 3-5. The wind rose provides a graphical description of the prevailing winds giving the frequency of occurrence of the wind speed and direction. The wind rose is a quantitative graphical summary of the wind direction and speed over a given time period. It shows the number of wind speed and direction observations, expressed as a percentage, which had a particular direction and speed during the summary period.

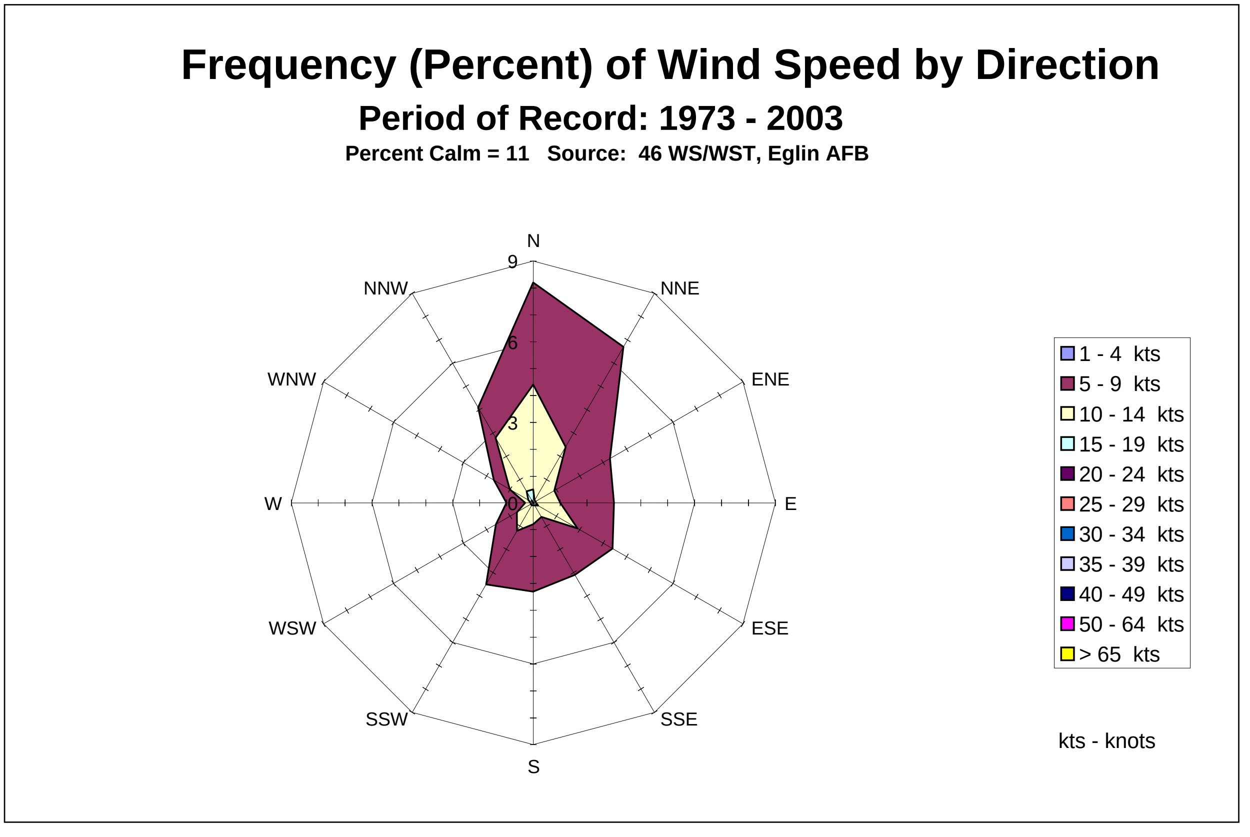

Figure 3-5 Annual Wind Rose for Keesler AFB

The “spokes” on the wind rose graph represent the 16 points of the compass. The percentage of time the wind blew from a given direction (without regard to speed) can be determined from a percent scale located on the wind rose. For a particular wind direction, the length of each segment of a spoke represents the percentage of time the wind was within a particular wind speed interval. If a specific wind speed interval were summed for all wind directions, the result would be the percentage of all hours the wind speed was measured within that particular interval. The percentage of time during which the wind was light and/or calm is provided separately on the rose.

3.3.10.2.2 Regional Air Quality

Keesler is located in the Mobile (Alabama)-Pensacola-Panama City (Florida)-Southern Mississippi Interstate Air Quality Control Region (AQCR 5). AQCR 5 consists of the territorial area encompassed by the boundaries of the following jurisdictions as described in 40 CFR 81.68:

- In the State of Alabama: Baldwin County, Escambia County, Mobile County
- In the State of Florida: Bay County, Calhoun County, Escambia County, Gulf County, Holmes County, Jackson County, Okaloosa County, Santa Rosa County, Walton County, Washington County
- In the State of Mississippi: Adams County, Amite County, Clairborne County, Clarke County, Copiah County, Covington County, Forrest County, Franklin County, George County, Greene County, Hancock County, Harrison County, Hinds County, Jackson County, Jasper County, Jefferson County, Jefferson Davis County, Jones County, Lamar County, Lauderdale County, Lawrence County, Lincoln County, Madison County, Marion County, Newton County, Pearl River County, Perry County, Pike County, Rankin County, Scott County, Simpson County, Smith County, Stone County, Walthall County, Warren County, Wayne County, Wilkinson County

Collection and analysis of air quality data is a basic need of any effective air pollution control program. During 2005, MDEQ operated a network of sophisticated continuous air analyzers and 24-hour samplers for the purpose of measuring ambient air levels of ozone, particulate matter, sulfur dioxide, carbon monoxide, nitrogen oxides, and hazardous air pollutants.

This monitoring network serves many purposes including:

- Determining attainment and non-attainment areas for ground-level ozone and particulate matter.
- Generating data to assist in determining methods to reduce visibility obscuration.
- Supporting ozone reduction programs and hazardous air pollutant programs.
- Determining general air quality trends.

MDEQ monitors all of the NAAQS pollutants except lead through their statewide air monitoring network. Lead has been monitored in the past. However, because the concentrations reported were so much lower than the air quality standard and because lead is no longer used in automobile fuels, it was determined by USEPA and MDEQ that it no longer needed to be monitored in Mississippi (MDEQ 2005b).

USEPA has designated Mississippi in attainment for all criteria pollutants.

3.3.10.2.3 Current Air Emissions

An air emission inventory is an effort to qualitatively and quantitatively describe the amount of emissions from a facility or within an area. Inventories are designed to locate pollution sources, define the type and size of emission sources, define and characterize emissions from each source, determine relative contributions to air pollution problems by classes of sources and by individual sources, and determine the adequacy of regulations. The air emissions inventory is an estimate of total mass emissions of pollutants generated from a source or sources over a period of time, normally a year. Accurate inventories are needed for estimating the interrelationship between emission sources and air quality and for determining whether an emission source requires an operating permit based on actual emissions or the potential to emit.

Every three years, USEPA prepares a national database of air emissions referred to as the National Emissions Inventory (NEI). The NEI is compiled using information from numerous state and local air agencies, from tribes, and from industry. This database contains information on stationary and mobile sources that emit criteria air pollutants and their precursors. There are three classes of sources in the inventory: (1) point sources (stationary sources of emissions, such as an electric power plant, that can be identified by name and location), (2) area sources (small point sources such as a home or office building, or a diffuse stationary source, such as wildfires or agricultural tilling), and (3) mobile sources (any kind of vehicle or equipment with a gasoline or diesel engine; airplane; or ship). The latest finalized version is for calendar year 2002. The calendar year 2002 NEI emissions inventory data for Harrison County Mississippi is presented in Table 3-18.

The latest air emissions inventory for Keesler AFB was accomplished in order to: (1) comply with applicable federal, state, and local pollution control standards, including the CAA; and (2) meet Title V permitting requirements of the CAA. The inventory quantifies emissions from stationary sources based on 2005 calendar year activity (USAF 2006d). The inventory does not indicate that Keesler AFB is a major source under Title V; however, it is a major source based on the potential to emit.

As a result of damage sustained from Hurricane Katrina (29 August 2005), several emission source categories were impacted and the base is still in a recovery phase. Therefore, the calendar year 2004 inventory (USAF 2005b) is also provided as a comparison. Keesler AFB emission inventories are presented in Table 3-18 along with the Harrison County inventory, also for comparison purposes.

Table 3-18 Baseline Emissions for Harrison County and Keesler AFB

Source Category	Pollutants (tons per year)				
	CO	NO_X	SO_2	PM_{10}	VOCs
Harrison County (2002)	76,846.00	26,298.00	39,471.00	11,762.00	16,509.00
Keesler AFB (2005)	21.74	37.14	1.21	2.83	6.89
Percent of Harrison County	0.03	0.14	0.00	0.02	0.04
Keesler AFB (2004)	20.40	27.89	0.36	2.30	7.34
Percent of Harrison County	0.03	0.12	0.00	0.02	0.04

CO carbon monoxide
NO_x nitrogen oxide
SO_2 sulfur dioxide
PM_{10} particulate matter with an aerodynamic diameter less than or equal to 10 microns
VOC volatile organic compound
O_3 ozone
A VOC is not a criteria pollutant. However, VOC is reported because, as an O_3 precursor, it is a controlled pollutant.

3.3.11 Cultural Resources

3.3.11.1 Definition of the Resource

Cultural resources may include prehistoric and historical archaeological sites, buildings, structures, districts, artifacts, objects, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, or religious purposes. Under 36 CFR 800, federal agencies must take into consideration the potential effect of an undertaking on “historic properties,” which refers to cultural resources listed in, or eligible for inclusion in, the National Register of Historic Places (NRHP). In order to be determined a “historic property,” the resource must meet one or more of the criteria established by the National Park Service and outlined in 36 CFR 60.4 that make the resource eligible for inclusion in the NRHP.

Cultural resources management at USAF installations is established in AFI 32-7065, *Cultural Resources Management.* The AFI details the compliance requirements for protecting cultural resources including the preparation of a Cultural Resources Management Plan (CRMP). The CRMP must include: an inventory and evaluation of all known cultural resources; identification of the likely presence of other significant cultural resources; description of installation strategies for maintaining cultural resources and complying with related resource statutes, regulations, policies, and procedures; standard operating procedures and action plans; clear identification and resolution of the mission impact on cultural resources; and conformance with local, state, and federal preservation programs. Keesler AFB completed a CRMP in 2003 (USAF 2003a).

3.3.11.2 Existing Conditions

Cultural resources at Keesler AFB are managed in accordance with environmental laws: Air Force Regulation 126-7, *Historic Preservation*; AFI 32-7061; the *National Historic Preservation Act* (NHPA) of 1966, as amended, and its implementing regulations, 36 CFR 800; EO 11593 of 1971; *Archaeological and Historic Preservation Act* of 1974 (Public Law [P.L.] 93-291); the *Archaeological Resources Protection Act* of 1979 (P.L 96-95); the *American Indian Religious Freedom Act* of 1978 (P.L. 95-341); the *Native American Graves Protection and Repatriation Act* of 1990 (P.L. 101-601); and Mississippi Department of Archives and History (MDAH) guidelines.

Keesler AFB is required to consider the effects of its undertakings on historic properties listed, or eligible for listing, in the National Register. NHPA obligations to a federal agency are independent from NEPA and must be complied with even when an environmental document is not required. As per AFI 32-7065 Sections 3.3.1 and 3.3.2, and 36 CFR 800.8, Keesler AFB incorporates NHPA Section 106 review into the NEPA process or substitutes the NEPA process for a separate NHPA Section 106 review of alternatives.

Archaeological Resources

The most current cultural resources baseline survey conducted at Keesler AFB (Thorne 1993) resulted in the determination that there are no known prehistoric or historic Native American Indian sites on the base, based on firsthand inspections as well as an examination and comparison of the photographic and cartographic history of the base property (USAF 2003a). In order to meet the intent of the *Native American Indian Religious Freedom Act of 1978* and the *Native American Graves Protection and Repatriation Act of 1990*, efforts would be made to contact four Indian tribes (Mississippi Band of Choctaw Indians, Choctaw Nation of Oklahoma, Jena Band of Choctaw Indians, and Tunica-Biloxi Indians of Louisiana) concerning any archaeological resources encountered at Keesler AFB. In addition, based on the level of surface and subsurface disturbance at the base, it has been determined that it is unlikely that any undiscovered historic or prehistoric archaeological sites are undisturbed, and the base is considered to be cleared of archeological resources (USAF 2003a).

Historic Resources

According to the most current cultural resources baseline survey (Thorne 1993), an architectural baseline survey of all of the buildings and structures at Keesler AFB (Walker 1988) resulted in the determination that Hanger 0228 is the only building at the base that is potentially eligible for nomination to the NRHP. No other buildings at Keesler AFB are eligible or potentially eligible for nomination to the NRHP (USAF 2003a). The proposed action includes the demolition of Hanger 0228.

In 2005, Keesler AFB determined that demolition would have an effect upon Hanger 0228. Hanger 0228 was originally a hangar from the Biloxi Municipal Airport and was built around 1938. This building was one of the few in the state associated with the early years of civil aviation between the first and second world wars. It is the only building predating the establishment of the base that retains its architectural character. The base consulted with the Mississippi State Historic Preservation Officer (SHPO) and the

Advisory Council on Historic Preservation (ACHP) requesting acceptance of the demolition of Hanger 0228 (USAF 2003b).

The MDAH recommended the one World War II era facility be retained as a reminder of the early years of the base. Keesler AFB selected the building that houses the Keesler AFB Heritage Display to serve as an example of the architectural and cultural aspects of this era (USAF 2003a).

Chapter 4

Environmental Consequences

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter describes potential impacts that could occur if the proposed action or the alternative action is implemented at Keesler AFB. Additionally, potential impacts are addressed for the no action alternative and cumulative impacts are analyzed for the additional actions proposed on or around Keesler AFB. Criteria used to evaluate potential impacts are discussed at the beginning of each resource area.

4.2 CHANGE IN CURRENT MISSION

In all cases, the primary missions of Keesler AFB would continue. However, implementation of the proposed action would allow Keesler AFB to meet mission and security requirements more effectively.

4.3 DESCRIPTION OF THE EFFECTS OF ALL ALTERNATIVES ON THE AFFECTED ENVIRONMENT

4.3.1 Noise

In this section, noise levels associated with proposed construction activities and aircraft operations at Keesler AFB are evaluated, and compared with current conditions to assess potential impacts. Data developed during this process also supports analyses in other resource areas.

Based on numerous sociological surveys and recommendations of federal interagency councils, the most commonly used benchmark for noise is an L_{dn} of 65 dBA. This threshold is often used to determine residential land use compatibility around airports and airfields, highways, or other transportation corridors. Two other average noise levels are also useful:

- An L_{dn} of 55 dBA has been identified by the USEPA as a level "...requisite to protect the public health and welfare with an adequate margin of safety" (USEPA 1974). Noise may be heard, but there is no risk to public health or welfare.
- An L_{dn} of 75 dBA is a threshold above which effects other than annoyance may occur. It is 10 to 15 dBA below levels at which hearing damage is a known risk (Occupational Safety and Health Administration 1983). However, it is also a level above which some adverse health effects cannot be categorically discounted.

Public annoyance is the most common impact associated with exposure to elevated noise levels. When subjected to L_{dn} of 65 dBA, approximately 12 percent of persons so exposed will be "highly annoyed" by the noise. At levels below 55 dBA, the percentage of annoyance is correspondingly lower (less than three percent). The percentage of people annoyed by noise never drops to zero (some people are always annoyed), but at levels below 55 dBA it is reduced enough to be essentially negligible. During the last 12 months, the 81 TW has received three noise complaints.

4.3.1.1 No Action Alternative

Under the no action alternative, no proposed construction activities would occur, and no additional aircraft operations would occur at Keesler AFB. Since no construction would occur, the noise associated with such activities would not result. Since no changes to aircraft operations or other transportation activities would result from this alternative, noise levels at Keesler AFB would remain as described in Section 3.3.1. In previous years, noise complaints have averaged approximately five to six per year (Taranto 2006). These complaint levels would not be of great concern. Noise issues associated with aircraft operations would be considered minimal.

4.3.1.2 Proposed Action

Under the proposed action, Keesler AFB would accomplish those construction and related demolition activities necessary to recover from the damage sustained as a result of Hurricane Katrina. The overall intent would be to return the installation to full operational capability. These proposals have the potential to create noise impacts in the ROI.

Construction Noise. Construction would most likely occur over an extended time frame (i.e., five years), and only a relatively small number of projects would be expected to be ongoing simultaneously. Therefore, noise associated with active construction sites would be expected to be intermittent and of relatively limited duration. A hypothetical scenario was developed to assess potential noise associated with construction activities on a construction site. Primary noise sources during such activity would be expected to be heavy vehicles and earth moving equipment. Table 4-1 shows sound levels associated with typical heavy construction equipment under varying modes of operation.

Table 4-1 Typical Sound Levels of Construction Equipment

Equipment	Sound Level (in dBA) under Indicated Operational Model[1]		
	Idle Power	Full Power	Moving under Load
Forklift	63	69	91
Backhoe	62	71	77
Dozer	63	74	81
Front-end Loader	60	62	68
Dump Truck	70	71	74

dBA A-weighted decibel
[1]Measured at 125 feet from source.

For the assessment of construction noise, a hypothetical "construction area" was designated that approximated the estimated area that would be involved in supporting a major project under the proposal.

The first step in the analysis was to estimate equipment usage and calculate the total acoustic energy that would be expected to be generated on the site. These data also provided information on each piece of equipment's relative contribution to the total amount of acoustic energy generated on the site. Next, the equipment was spatially distributed throughout the construction zone considering "most likely" areas of operation. This yielded an equipment-weighted contribution to total site acoustic energy at different points throughout the site. With this spatial distribution, it was then possible to calculate a mean and standard deviation for the distribution along an axis running through the site.

These data were then used to normally distribute the total site energy throughout the site. Finally, the normally distributed energy from multiple source points throughout the site was aggregated at a range of points at varying distances from the site edge. This allowed a determination at those points of the total acoustic energy that had emanated off-site.

Calculations based on this conservative scenario indicate an equivalent noise level over an $L_{eq(8)}$ of 67 dBA at a distance of 500 feet from the edge of the site. This is then normalized to an equivalent noise level over an $L_{eq(24)}$ of 62 dBA. Since no construction activity would be expected to occur at night, this would be equivalent to L_{dn} 62 dBA. At a distance of 1,000 feet from the site, noise levels are $L_{eq(8)}$ 62 dBA and $L_{eq(24)}$ 58 dBA. Due to the conservative nature of the scenario, and the fact that sound attenuation only due to spherical spreading was considered, actual levels emanating off-site would be expected to be lower.

It should be noted that the areas involving construction are situated within areas already exposed to elevated noise from airfield operations. Many of these areas are well within the L_{dn} 65 contour created by aircraft noise. Construction noise emanating off-site would probably be noticeable in the immediate site vicinity, but would not be expected to create adverse impacts, or alter noise contours associated with aircraft operations. Furthermore, construction-related noise is intermittent and transitory, ceasing at the completion of construction. The long-term acoustic environment on Keesler AFB would not be expected to be impacted by construction activities.

Aircraft Noise. Under the proposed action, no changes to existing aircraft activity would occur. Noise associated with aircraft operations would continue as described in Section 3.3.1.

4.3.1.3 Alternative Action

Under the alternative action, the same activities described under the proposed action would be accomplished. In addition, physical facilities would be developed to the maximum extent supportable by the geographic area available on the installation. Aviation operations conducted by Keesler AFB-based prime mission aircraft would be increased to the maximum extent practicable, as limited either by the throughput capability of the airfield or by increased noise levels. As determined in the Capability Study (Appendix B), noise level increases are the limiting factor to the expansion of aircraft operations. The maximum increase was reached when C-130J operations were increased by 60 percent. Only "primary mission-based" aircraft (C-130-type) were modeled to provide the most conservative case output. At this level of C-130J operations, overall aviation activity at Keesler AFB increased by approximately 15 percent.

Construction Noise. Under this alternative, the scope of facility construction, renovation, and demolition would be greater than under the proposed action. However, the accomplishment of these activities would be as described for the proposed action. The only difference that would be expected would be that construction activities would be expected to occur over an extended period. During any one period, noise associated with these activities would be expected to be more or less as described for the proposed action.

Aircraft Noise. The increase in aviation operations around the airfield would result in increased noise levels. Table 4-2 reflects this increase in daily operations. Average daily operations at Keesler AFB would increase from the current level of approximately 146 operations per day to approximately 168 operations per day.

Table 4-2 Average Number of Daily Operations at Keesler AFB under the Alternative Action[1]

Aircraft	Arrivals		Departures		Closed Patterns		Totals
	Day	Night	Day	Night	Day	Night	
Based C-130	8.550	0.133	8.712	0.000	41.645	0.000	59.040
Based C-12	6.856	0.000	6.856	0.000	49.884	0.000	63.596
Based C-21	9.138	0.000	9.136	0.000	8.284	0.000	26.558
Rotary Wing	1.235	0.000	1.326	0.000	0.000	0.000	2.470
Transient	4.920	0.121	4.918	0.121	5.488	0.000	15.568
Civil	0.300	0.000	0.300	0.000	0.000	0.000	0.600
Total	**30.979**	**0.254**	**31.138**	**0.121**	**105.301**	**0.000**	**167.793**

Source: USAF 2006b
[1]Number of daily operations are based on averages of annual operations; therefore, numbers do not round.

Noise contours associated with the increased level of aircraft operations are shown in Figure 4-1. Land areas exposed to the elevated noise levels associated with the alternative action are compared with current conditions in Table 4-3, and changes in noise levels at specific points of interest in sensitive land use categories are compared in Table 4-4. As shown, higher noise levels are expected at points located both on and off base. It should be noted that much of the exposure in the 65 dB to 75 dB L_{dn} range off base is over water. As indicated, at Point 9, an already incompatible land use becomes more incompatible (See Appendix B).

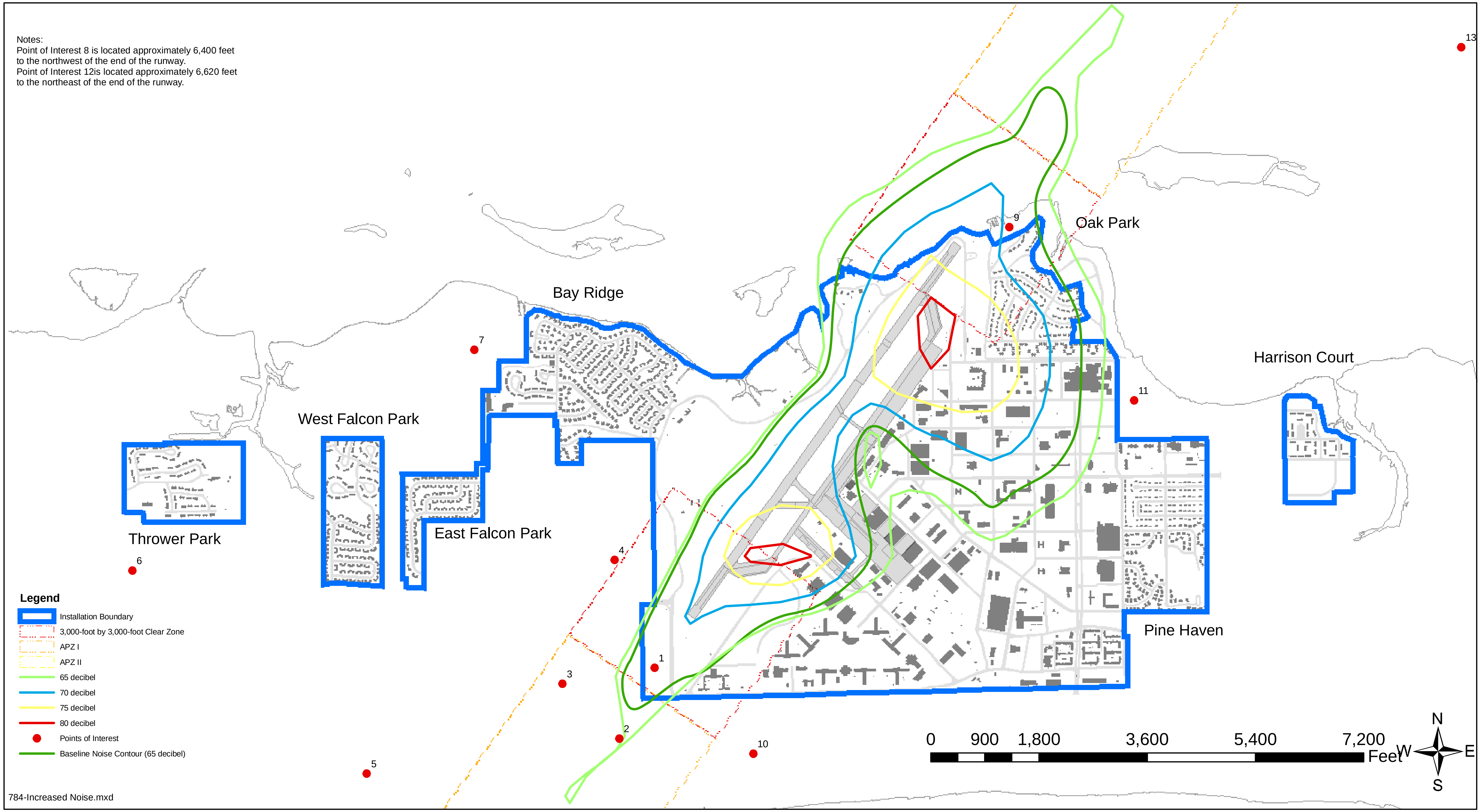

Figure 4-1 Baseline Noise Contours versus Increased Capability Noise Contours, Keesler Air Force Base, Mississippi

Table 4-3 Land Area Exposed to Elevated Noise under the Alternative Action

Sound Level (in L_{dn})	Acres of Land Baseline	Acres of Land Proposed	Net Change	Percent Change
On Base				
65 – 70	285.00	323.65	38.65	13.6%
70 – 75	177.37	208.70	31.33	17.7%
75 – 80	91.28	118.63	27.35	30.0%
80 – 85	1.41	11.69	10.28	729.1%
> 85	0.00	0.00	0.00	0.0%
Total > 65	**555.06**	**662.67**	**107.61**	**19.4%**
Off Base				
65 – 70	98.29[1]	179.59[2]	81.3	82.7%
70 – 75	12.2[3]	27.43[4]	15.23	124.8%
75 – 80	0.00	0.00	0.00	0.0%
80 – 85	0.00	0.00	0.00	0.0%
> 85	0.00	0.00	0.00	0.0%
Total > 65	**110.49**	**207.02**	**96.53**	**87.4%**
Total Land Area				
65 – 70	383.29	503.24	119.95	31.3%
70 – 75	189.57	236.43	46.86	24.7%
75 – 80	91.28	118.63	27.35	0.0%
80 – 85	1.41	11.69	10.28	0.0%
> 85	0.00	0.00	0.00	0.0%
Total > 65	**665.55**	**869.69**	**204.14**	**30.7%**

Source: Determined from noise contours using Geographic Information System
Note:
[1]Includes 85.14 acres over water
[2]Includes 133.81 acres over water
[3]All 12.2 acres are over water.
[4]Includes 25.5 acres over water
L_{dn} Day-Night Average Sound Level % percent

Table 4-4 Specific Point Noise Exposure under the Alternative Action

Point Identification	Description	Exposure (in L_{dn}) Current	Exposure (in L_{dn}) Alternative	Change (in L_{dn})
1	Point 1,100 feet southwest of Runway 21	68.1	69.0	+ 0.9
2	Point 2,400 feet southwest of Runway 21	65.3	66.2	+ 0.9
3	Point west-southwest of Runway 21	58.4	59.1	+ 0.7
4	Jeff Davis Elementary School	56.9	57.5	+ 0.6
5	Point southwest of Runway 21	50.3	51.0	+ 0.7
6	Our Lady of Fatima Church / School	48.6	48.9	+ 0.3
7	Biloxi National Cemetery	48.0	48.7	+ 0.7
8	Point North of Runway 03	51.1	52.6	+ 1.5
9	Point Northeast of Runway 03	66.6	68.1	+ 1.5
10	West End Elementary School	55.0	55.8	+ 0.8
11	Biloxi Regional Medical Center	60.7	62.6	+ 1.9
12	D'Iberville Elementary School	51.8	53.1	+ 1.3
13	D'Iberville Middle School	49.4	50.3	+ 0.9

L_{dn} Day-Night Average Sound Level

Source: Moulton 1990

4.3.1.4 Cumulative Impacts

Other proposed and/or ongoing activities within the ROI that involve overall recovery and reconstitution of Biloxi, Mississippi from Hurricane Katrina would be expected to generate construction and traffic noise over the duration of each project. These projects are dispersed throughout the region and are not atypical sources of noise in the community. Construction noise emanating off site as a result of the proposed action and/or alternative actions, and the activities in the region would probably be noticeable only in the immediate construction site vicinity, but would not be expected to create adverse impacts. In addition, aircraft noise associated with the alternative action, in concert with other reconstitution activities would similarly not be expected to create adverse impacts. Cumulative impacts from noise would be expected to be minimal.

4.3.1.5 Measures to Reduce Impacts

Since major construction activities are planned to be conducted only during the day, potential impacts at night (when community ambient noise levels are normally lower) will be minimized.

For aircraft operations at Keesler AFB, continuation of current noise abatement procedures (i.e., minimal operations at night) will remain in effect, and continue to minimize noise impacts.

4.3.2 Aircraft Management and Air Traffic Control

The potential effects of the proposed and alternative actions on the existing airspace environment were assessed by considering the changes in airspace utilization that could result from the proposals.

The type, size, shape, and configuration of individual airspace elements in a region are based upon, and are intended to satisfy, competing aviation requirements. Potential impacts could occur if air traffic in the region and/or the ATC systems were encumbered by changed flight activities associated with the proposed action or an alternative. Impacts could result if such changes adversely affected (1) ATC systems and/or facilities; (2) movement of other air traffic in the area; or (3) airspace already designated and used for other purposes supporting military, commercial, or general aviation.

4.3.2.1 No Action Alternative

Under the no action alternative, no additional aircraft activity would occur at Keesler AFB. Operations at the airfield and in the military training airspace would continue at the same levels as under current conditions.

4.3.2.2 Proposed Action

Under the proposed action, new construction and facility renovation activities would occur. These proposals involve no modifications or changes to unit flight activities from current operations. No adverse impacts to the airspace around Keesler AFB or the existing ATC systems would be anticipated.

4.3.2.3 Alternative Action

Under the alternative action, which could result in an expansion of Keesler AFB's maximum potential, up to 60 percent additional C-130 sorties could be flown from Keesler AFB. This would equate to approximately 3.25 additional sorties per day. If a linear expansion in aviation operations is assumed, daily operations at the airfield would increase from approximately 146 to 168. Based on throughput capacity models developed by the FAA, an airfield such as Keesler AFB's is capable of handling approximately 944 daily operations, even under adverse weather conditions. Refer to Appendix B for additional details. No adverse impacts to the airspace around Keesler AFB or the existing ATC systems would be anticipated.

The airfield (overall) and airspace assets (in general) are physically able to accommodate the increased number of C-130 operations associated with the alternative action.

No modifications to controlled airspace, SUA, or ATC systems are associated with, or would be required by implementation of the alternative action.

4.3.2.4 Cumulative Impacts

There are no known aviation-related projects in the region of influence that would have the potential to impact airspace availability or air traffic control.

4.3.2.5 Measures to Reduce Impacts

Since impacts that would result from the implementation of the alternative action, are essentially non-existent, no specific measures would be recommended to further minimize them.

4.3.3 Land Use

Land use impacts can result if an action displaces an existing use or reduces the suitability of an area for its current, designated, or formally planned use. In addition, a proposed activity may be incompatible with local plans and regulations that provide for orderly development to protect the general welfare of the public, or may conflict with management objectives of a federal or state agency for an affected area. The methodology to assess impacts on individual land uses requires identifying those uses, as well as affected land use planning and control policies and regulations and determining the degree to which they would be affected by the proposal.

To assess impacts to visual resources, areas that have high visual value or low tolerance for visible modification or have prescribed guidelines are identified. Visual impacts are assessed by determining how, and to what extent, a proposed action would alter the overall visual character of the area.

4.3.3.1 No Action Alternative

Under the no action alternative, there would be no change from the baseline conditions described in Section 3.3.3. All of the existing facilities would remain, and no new facilities would be constructed. No impacts to land use or visual resources are expected. Keesler AFB would continue to manage on-base development activity according to the *General Plan* and established planning, architectural, landscaping, and civil guidelines. Coordination with local communities affected by overflight activity would continue with the AICUZ program.

4.3.3.2 Proposed Action

Keesler AFB has identified the need for construction, demolition, and renovation of facilities for 36 projects. The future land use categories identified in the *General Plan* that surround each of the proposed action locations have been evaluated, and the proposed action would be consistent with land use concepts defined for the installation by base planners. No additional land would be needed to accommodate the activities associated with the proposed action.

The extent of new construction, renovation, and demolition would somewhat alter the overall visual character of the area. Any development activity undertaken on Keesler AFB would be consistent with established planning, architectural, landscaping, and civil engineering guidelines to ensure that the base's character and aesthetic qualities are retained.

Under the proposed action, there would be no modification to current aircraft operations.

4.3.3.3 Alternative Action

Under the alternative action, no direct effect on land use resources is anticipated. This alternative would reduce the amount of open space on the installation, although acreage constrained by environmental factors (e.g., wetlands, floodplain, safety easements, etc.) would remain open. Development that would occur as a result of the alternative action would be consistent with land use concepts as defined in the *General Plan* and established planning, architectural, landscaping, and civil engineering guidelines. No additional land would be needed to accommodate the activities associated with the alternative action.

The extent of development associated with the alternative action would somewhat alter the overall visual character of the area. Any development activity undertaken on Keesler AFB would be consistent with established planning, architectural, landscaping, and civil engineering guidelines to ensure that the base's character and aesthetic qualities are retained.

The modification to aircraft operations, including an increase in flying operations, does not appreciably increase the noise contours. Figure 4-1 and Table 4-3 present the new contours and affected acreage. There are no sensitive land use categories underlying these contours. In fact, the majority of the off-base exposure from 65 dB to 75 dB L_{dn} is over water. However, there are residential areas currently exposed to aircraft overflight that will continue to be affected. Land use patterns, ownership, and management plans would not be expected to change based on the modification of aircraft operations.

4.3.3.4 Cumulative Impacts

Other proposed and/or ongoing activities within the ROI, as described in Section 2.7, are not expected to substantially modify or render existing land uses incompatible either at Keesler AFB or in the general ROI. The long-term objective at Keesler AFB is to combine like activities spatially, and the projects described in this analysis work toward that end. There would be a general overall positive result from implementation of these projects. As a result, there would not be any cumulative adverse impacts to land use as a result of the proposed action or alternative actions.

4.3.3.5 Measures to Reduce Impacts

Land use impacts would not be anticipated at Keesler AFB for the proposed action or the alternative actions. Therefore, no measures to reduce impacts would be required as a result of the implementation of the proposed action or alternative actions.

4.3.4 Earth Resources

Protection of unique geologic features, minimization of soil erosion, and relation of existing facilities to potential geologic hazards, soil limitations, and sharp topological features are considered when evaluating impacts to earth resources. Generally, impacts can be avoided or minimized if proper construction techniques, erosion control measures, and structural engineering designs are incorporated into project development

Analysis of potential impacts to geologic resources typically includes identification and description of resources that could potentially be affected, examination of the potential effects that an action may have on the resource, and provision of measures to reduce impacts, if necessary. Analysis of impacts to soil resources resulting from proposed activities examines the suitability of locations for proposed operations and activities. Impacts to soil resources can result from earth disturbance that would expose soil to wind or water erosion.

4.3.4.1 No Action Alternative

Under the no action alternative, the 81 TRW would maintain their existing facilities, and would not construct any new facilities. Similarly, there would be no demolition activity. No impacts to earth resources would occur as a result of the no action alternative. Conditions would remain as described in Section 3.3.4.

4.3.4.2 Proposed Action

Under the proposed action, the physiography, underlying geology, and topography of the area would not change; however, the soil would be disturbed by construction activities. Under this alternative, approximately 76 acres of land would be disturbed and 28 acres of land rendered impervious as a result of new building footprints, associated pavements, and demolition activities. Well-maintained silt fences, wetting of the construction site, daily site inspections, and other BMPs would be used to limit or eliminate soil movement, stabilize runoff, and control sedimentation. Following construction, disturbed areas not covered with impervious surfaces would be reestablished with appropriate vegetation and managed to prevent future erosion. Given the relatively small area disturbed at any one given time, and the employment of BMPs to minimize potential erosion, impacts to earth resources as a result of the proposed action are expected to be minimal.

4.3.4.3 Alternative Action

Under the alternative action, the physiography, underlying geology, and topography of the area would not change. It is estimated that a total of approximately 112 acres would be disturbed and 85 acres rendered impervious as a result of construction and paving activities. Although the alternative action would result in more impervious cover and three times more land disturbed than the proposed action, it is clear that construction activities would not all occur at the same time. Construction would occur only as the need arose and as funds became available. It is unlikely that more than 10 percent (9.3 acres) of construction activity would occur at any given time. Well-maintained silt fences, wetting of the construction site, daily site inspections, and other BMPs would be used to limit or eliminate soil movement, stabilize runoff, and control sedimentation. Following construction, disturbed areas not covered with impervious surfaces would be reestablished with appropriate vegetation and managed to prevent erosion. Given the relatively small potentially disturbed area at one given time and the employment of BMPs to minimize potential erosion, impacts to earth resources are not expected to be significant.

Under the alternative actions, impacts to soils would be similar as those described under the proposed action.

4.3.4.4 Cumulative Impacts

Several other ground-disturbing activities currently underway or planned in the short-term (Section 2.7), as well as the massive regional Hurricane Katrina recovery effort, will generate large amounts of C&D activity throughout the ROI. These projects are likely to disturb several thousand acres of soil over the next several years. It is also likely that MDEQ will be heavily involved in the Hurricane Katrina recovery effort to ensure that soil erosion is minimized to the greatest extent practicable. The USAF would implement appropriate BMPs to minimize potential erosion during construction activities for future projects. Additionally, appropriate vegetation would be reestablished on the sites to ensure rapid soil stabilization. Cumulative impacts to earth resources are expected to be minor. Within the context of the regional Hurricane Katrina recovery effort, the proposed action or alternative actions are not expected to appreciably contribute to cumulative impacts associated with earth resources.

4.3.4.5 Measures to Reduce Impacts

The potential for impacts to earth resources from C&D activities is expected to be minimal. The control of on-site erosion, off-site water runoff, and measures to contain sediment are essential components of NPDES permitting and SWPPP requirements. Although specific requirements would not be determined until the permitting process is completed, the list of BMPs for controlling erosion during or after construction activities is extensive. A few typical BMPs for soil erosion that are likely to be required for the proposed action and alternative action include reconditioning damaged soils, stabilization of sloping soils, transportation of runoff within non-erosive water conveyance systems, interception and diffusion the erosive energy of runoff at predetermined intervals, and transitioning of water flows to non-erosive discharge points.

4.3.5 Water Resources

Criteria for evaluating impacts related to water resources are water availability, water quality, and adherence to applicable regulations. Impacts are measured by the potential to reduce water availability to existing users, endanger public health or safety by creating or worsening health hazards or safety conditions, or violate laws or regulations adopted to protect or manage water resources.

Water availability impacts are assessed by determining the potential increases in use that may affect availability of water resources. Floodplain and surface water impact analyses were conducted by first identifying floodplain areas associated with water bodies at Keesler AFB and their proximity to potential development sites. Next, analyses were done using relevant literature to calculate the potential and the extent of all impacts in the affected areas.

4.3.5.1 Surface Water

4.3.5.1.1 No Action Alternative

Under the no action alternative, water resources would remain comparable to baseline conditions as described in Section 3.3.5.2.

4.3.5.1.2 Proposed Action

Under the proposed action, several facilities would be constructed and demolished at Keesler AFB. Table 2-1 details the total area associated with each project (including multi-story facilities). Building space typically includes multiple floors and does not add directly to pavements to provide impervious surfaces. Impervious surfaces are determined by building footprints and the pavements surrounding them. Based on analysis of the project list, approximately 63 acres of new construction and 35 acres of associated demolition would occur. A total of 28 acres of impervious cover would be added to the installation. Table 2-1 describes additional details on individual projects listed in the proposed action.

The proposed action would add to the impervious surfaces associated with Keesler AFB. In general, increases in impervious surfaces act to increase peak discharge volume and speed delivery of water to nearby streams and waterways, which ultimately increases the likelihood of flooding. In undeveloped land, rainfall collects and is stored in vegetation, in the soil column, or in topographic depressions. Water is then utilized by plants and is respired, or it moves slowly into groundwater and/or eventually to surface water bodies where it slowly moves through the hydrologic cycle. Removal of vegetation decreases infiltration into the soil column and thereby increases the quantity and timing of runoff. Replacement of vegetation with an impervious surface eliminates any potential for infiltration and speeds up delivery of the water to nearby drainage and stream channels. With less storage capacity in the soil column and vegetation, urban streams rise more quickly during storm events and have higher peak discharge rates, which both increase the potential for flooding.

There are currently approximately 604 acres of impervious cover on Keesler AFB; implementation of the proposed action would increase total impervious cover by approximately 4.6 percent. Subsequently, the total volume of stormwater runoff would increase by an estimated 2.1 percent, based on a negligible increase in the site wide weighted average runoff coefficient from 0.552 to 0.564[2]. The curbs and gutters installed during any street and off-street parking construction would be connected to the existing stormwater system. An additional 24.4 acre-feet of site wide stormwater detention capacity would be a consideration for mitigating any perceived off-site impacts, which would be minimal.

The construction associated with the proposed action would increase impervious surfaces on Keesler AFB. During large rainfall events, impervious surfaces increase the speed at which water flows into receiving surface water bodies by removing natural barriers and reducing infiltration into the ground. The potential for stormwater to carry contaminants that could flow directly into surface waters is also a concern when impervious areas increase. In accordance with the installation's SWPPP, BMPs (including techniques such as berms, sediment traps, silt fences, and windbreaks) would be implemented to minimize any runoff and subsequent degradation of surface water quality. In addition, the USEPA's NPDES program requires that since the individual sites are part of a larger area (i.e., part of a military installation) a Notice of Intent (NOI) under the USEPA-administered Construction General Permit is required to be filed for any site disturbance, even for sites less than one acre in size. Adequate control of runoff and erosion must also be demonstrated at each site. Therefore, water quality would not be adversely impacted by the proposed action.

4.3.5.1.3 Alternative Action

Approximately 112 acres of land would be temporarily disturbed for the alternative action, resulting in a net increase of approximately 85 acres of impervious surfaces, an increase of 14 percent. Subsequently, the total volume of stormwater runoff would increase by an estimated 6 percent, based on the increase in the site wide weighted average runoff coefficient from 0.552 to 0.587[3]. An additional 74 acre-feet[4] of site wide stormwater detention capacity would be a consideration to reduce any perceived off-site impacts, which would be minimal.

The construction and demolition activities would be conducted consistent with the requirements of the NPDES stormwater program, as described in Section 4.3.5.1.2.

[2] Runoff coefficients used are the same as those to describe the current condition, only the amount of impervious land is increased by 28 acres. [(0.95)*(604+28 impervious acres)+(0.30)*(1,558-604-28 vegetated acres)] divided by 1,558 total acres is equivalent to 0.564, which indicates a 2.1 percent increase in runoff, or 24.4 acre-feet of water in a 24 hour period for a 25-year storm (11.0 inches per day with an intensity of 4.2 inches per hour, assuming a 20-minute time of concentration [National Oceanic and Atmospheric Association {NOAA} 2006]).

[3] Runoff coefficients used are the same as those to describe the current condition and proposed action, only the amount of impervious land is increased by 85 acres. [(0.95)*(1,558+85 impervious acres)+(0.30)*(1,558-604-85 vegetated acres)] divided by 1,558 total acres is equivalent to 0.587, which indicates a 6 percent increase in runoff, or 74 acre-feet of water in a 24 hour period for a 25-year storm (11.0 inches per day with an intensity of 4.2 inches per hour, assuming a 20-minute time of concentration [NOAA 2006]).

[4] Note that an additional 54.3 acre-feet of water during a flood event would elevate the surface of the 6,400-acre Big Lake by 0.13 inches.

4.3.5.1.4 Cumulative Impacts

The proposed and alternative actions, when considered with respect to other ongoing actions, would have a minimal net cumulative impact on surface water at Keesler AFB when compared to the whole installation. There would be minor adverse impacts on surface water quality due to construction and demolition. The proposed and ongoing actions would result in an increase of 29 acres of impervious surfaces while the alternative and ongoing action would result in an increase of 86 acres of impervious surfaces. The proposed and cumulative actions would increase impervious cover by 4.8 percent and 14.2 percent for the alternative and cumulative actions. Total runoff for the proposed and cumulative actions would increase by 2.14 percent (25.3 acre-feet of additional runoff in 24 hours) and 6.1 percent (75 acre-feet of additional runoff in 24 hours) for the alternative and cumulative actions. Similar impacts might be expected from other construction activities as loose soil is exposed to runoff during rain events. The net cumulative effect on stormwater at Keesler AFB due to the proposed or alternative activities would be minimal when compared to the whole installation. Sediment erosion would be controlled using BMPs during construction and demolition, negating large-scale adverse effects on surface waters. Therefore, minor cumulative impacts would be expected on surface water.

4.3.5.1.5 Measures to Reduce Impacts

The proposed action and alternative action construction and demolition activities have the potential to affect the quality of stormwater runoff through a potential increase in soil erosion at each site. Impacts on water resources from the proposed action and alternative actions would be minimal when compared to the whole installation. However, BMPs would be used to reduce or eliminate runoff or contamination into surface water bodies or the groundwater. Site-specific sediment and erosion control plans with detailed BMPs to prevent soil disturbance, capture and contain loose soil, and slow the movement of stormwater during heavy rains would be included in the project development. No other measures to reduce impacts would be required to ensure surface water quality.

4.3.5.2 Groundwater

4.3.5.2.1 No Action Alternative

Under the no action alternative, there would be no change from the baseline conditions described in Section 3.3.5.3.

4.3.5.2.2 Proposed Action

There would be negligible effect on groundwater from implementation of the proposed action. None of the activities associated with the proposed action would involve installation of materials or equipment that would degrade groundwater quality. Standard BMPs to reduce runoff (such as revegetation of disturbed areas or sediment fencing) would minimize adverse impacts to shallow groundwater quality. Though construction would create more impervious surfaces, the increase would not likely affect the quality of the shallow aquifer. Therefore, only minor effects would be expected on the two aquifers that supply Keesler AFB.

The proposed action would not result in increased use of the two aquifers utilized by Keesler ABF because no increases in personnel or aircraft operations are associated with the proposed action. The proposed action would not reduce water availability to existing users or degrade or worsen groundwater quality of the two aquifers utilized by Keesler AFB; therefore, the proposed action would not result in adverse effects on groundwater resources.

4.3.5.2.3 Alternative Action

The alternative action would result in increased use of the two aquifers that provide groundwater to Keesler AFB due to increased base population personnel (11,716 additional people) and aircraft operations. Keesler AFB maintains its own potable water system (USEPA PWS Number 0240049) which supplies water from two aquifers (Lower Graham Ferry and Upper Pascagoula) to the base and to one off-base customer (VA Gulf Coast Veterans Health Care System hospital). The amount of surplus potable water available to Keesler AFB could support an additional population of at least 13,000 additional persons over the 2004 population based on a typical average daily per capita consumption (Appendix B). Appendix B provides additional details relating to the potable water system on Keesler AFB. The alternative action is not expected to appreciably contribute to impacts associated with groundwater.

4.3.5.2.4 Cumulative Impacts

The proposed action or alternative actions, when combined with the other actions proposed in the area, would result in a slight increased use of water. Demand for water will continue to increase in the future as both population and industry increase in the region. The City of Biloxi is presently drilling deeper wells to alleviate the current demand on the 600-foot aquifer (USAF 2006d). The usage of the aquifers is monitored and evaluated by the MDEQ. Minor adverse cumulative impacts from the proposed action and alternative actions would be expected as a result of increased use of the two aquifers utilized by Keesler AFB.

4.3.5.2.5 Measures to Reduce Impacts

Should the proposed or alternative actions be implemented, measures to protect human health and welfare would not be required. However, BMPs would be used to reduce or eliminate runoff or contamination into surface water bodies or the groundwater. Site-specific sediment and erosion control plans with detailed BMPs to prevent soil disturbance, capture and contain loose soil, and slow the movement of stormwater during heavy rains would be included in the project development. Continued good stewardship of the amount of groundwater withdrawal would help to alleviate potential regional groundwater supply shortages.

4.3.5.3 Floodplains

As defined in 44 CFR § 9.4, natural values of floodplains include natural moderation of floods, water quality maintenance, groundwater recharge, habitats, open space, and recreation, among others. These natural benefits are not as pronounced in tidal floodplains (such as the one at Keesler AFB) when compared to riverine floodplains. By incorporating stormwater BMPs and other engineering controls, adverse impacts to floodplains would be minimized. Any project constructed in the floodplain would conform to City of Biloxi building code requirements regarding construction in a floodplain or flood hazard area and Mississippi Emergency Management Agency floodplain management guidance.

4.3.5.3.1 No Action Alternative

The construction and demolition activities associated with the proposed and alternative actions would not take place. Therefore, no additional impacts to the floodplain would occur under the no action alternative beyond the impacts previously evaluated for the MFH effort.

4.3.5.3.2 Proposed Action

This EA uses the FEMA-recommended 16-foot contour as the 100-year floodplain for areas potentially impacted by coastal flood waters. The 16-foot contour is based on new wave zone mapping performed after Hurricane Katrina. Three projects associated with the proposed action (Projects 29, 30, and 36) would be located in areas designated part of the 100-year floodplain:

Main Gate, Visitor's Center, and Recreational Complex

This project includes the construction of an anti-terrorism force protection gate on Division Street (Figure 4-2). A new consolidated Visitor's Center (including the Pass and Registration Office), Main Gate House, and associated parking would be constructed in the floodplain. A recreational complex (softball and soccer fields) and associated parking would also be sited in the floodplain, near the Main Gate entrance. Figure 4-2 shows the location of the new roadway, gate facilities, parking areas, and recreational structures.

The Main Gate and Visitor's Center concept was developed to reduce the traffic congestion and ensuing hazards that currently exist at Gate 3 on White Avenue. The project was the result of an Air Force gate study that recommended the relocation of visitors' traffic to a new gate connected to Division Street, which has direct access to the local Interstate road system.

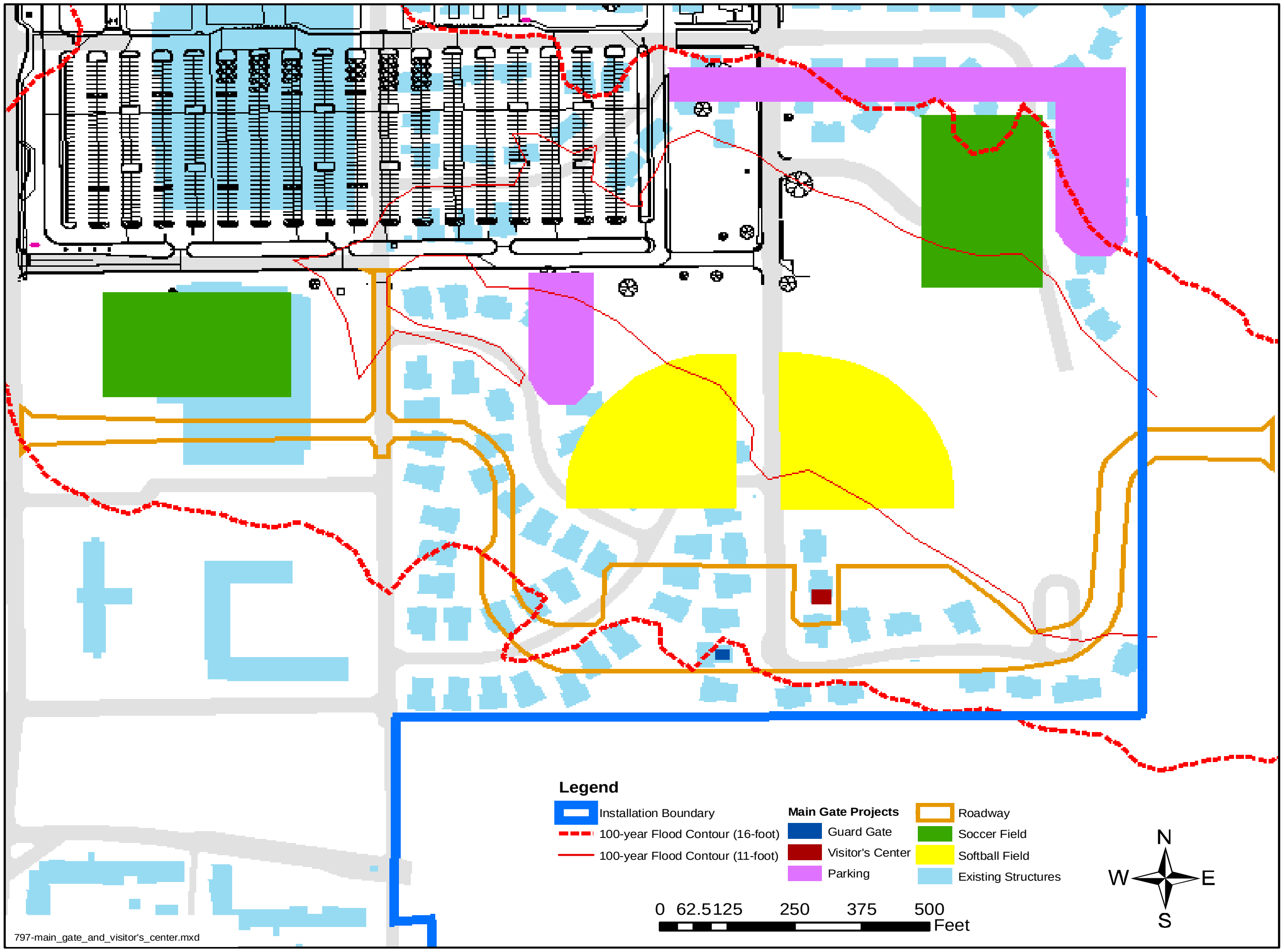

Figure 4-2 Main Gate and Visitor's Center

As originally outlined in the *General Plan* (prior to Hurricane Katrina), the new Division Street road system was to enter the base and travel north to Meadows Avenue. The visitor's center and new gate complex were planned to be sited just south of North Court Street, which would be well outside the new 100-year floodplain (16-foot contour). The existing Base Exchange and Commissary were to remain at their current location and new Permanent Party Dormitories (projects 2 through 6) were to be relocated from their current location near the base's southeast boundary to the North Pinehaven housing area. Relocation of the Permanent Party Dormitories is required in order to meet DoD Force Protection requirements.

This original plan was altered because the existing Base Exchange/Commissary complex was severely flooded during Hurricane Katrina and is currently located within the new 100-year floodplain. To reduce the Air Force's overall mission risk, the largest facilities (Base Exchange, Commissary, and Permanent Party Dormitories) were re-sited on the highest ground available (along Meadows Avenue and within the North Pinehaven housing area), so that as much of the facilities as possible were sited outside the floodplain. Because these large facilities were re-sited in the path of the originally planned entrance, the new Division Street gate roadway system was routed south through the 100-year floodplain in order to accomplish enhanced traffic flows and increased security for the overall base as outlined in the concepts of the *General Plan*, while accommodating the new requirements imposed after Hurricane Katrina.

The Gate House and Visitor's Center are required facilities that would be constructed in association with the new roadway. Vertical facilities would be sited outside the floodplain to the extent possible. The Gate House would be located outside of the 100-year floodplain as indicated on Figure 4-2, but the Visitor's Center would be within the new 100-year floodplain. Approximately 1,700 square feet of building construction would be located in the floodplain. In order to minimize the potential impact of the floodplain on the new structure, the facility would be sited on the highest ground available and the foundation of the Visitor's Center would be constructed so (1) the floor of the facility would be elevated above the new 100-year floodplain and (2) the base of the foundation would be protected from erosion with appropriate safety margins. Approximately 300,000 square feet of roadway and parking areas associated with the new entrance and nearby recreational area would also be located in the floodplain.

Construction of a recreational area including softball and soccer fields is associated with the project north of the designed entrance road system. Approximately 300,000 square feet of recreational fields would be located in the floodplain. The project includes construction of a replacement softball field for the existing field that would be displaced to accommodate construction of a library (Project 33) replacing the existing library damaged during Hurricane Katrina. The recreational fields are located in the floodplain to provide additional area in other parts of the base for development of needed replacement facilities; maximizing land use and minimizing the risks associated with the placement of buildings within areas with greater flooding potential.

The area proposed for construction of the Main Gate, Visitor's Center, and Recreational Complex is situated in South Pinehaven. The project would be sited over the existing Commissary and parking lot, a housing area, and open green areas. Approximately 10.1 acres of impervious surfaces are associated with the existing structures and pavements within the floodplain. The proposed Main Gate projects would decrease the impervious surfaces attributed to structures by 2.1 acres and to pavements by 1 acre for a net decrease in impervious surfaces of 3.1 acres within the floodplain. Pervious surfaces (available for rainwater infiltration) would increase by 3.1 acres, in addition to the approximately 6.9 acres of recreational fields included in the projects that would be sited within the floodplain. Replacement of pavements with vegetation would increase the potential for infiltration and would also slow the speed of delivery of the stormwater to nearby drainage and stream channels. The vegetated areas would provide sufficient drainage and infiltration to lessen potential impact of the stormwater runoff associated with the construction of the Main Gate projects.

BMPs would also be implemented to structurally moderate the volume and slow the discharge of stormwater associated with the new pavements. Landscaping would be installed in strategic locations of the proposed action project areas to increase infiltration capability. A NPDES General Construction Permit and associated SWPPP with BMPs would be required for the project, and would include structural and programmatic controls to eliminate pollution from construction- and operational-related runoff. During the clearing, grading, and construction of facilities, erosion control BMPs would be employed to minimize erosion into nearby waterways on the site. These measures would include installation of silt fences or berms between waterways and the ongoing construction processes. Minimal adverse effects would be expected by construction of the roadway, Visitor's Center, and recreational fields in the floodplain due to the implementation of structural stormwater BMPs during the design and installation of the facilities.

Base Exchange (Shopping Center Complex)

This project includes the replacement and construction of the Base Exchange within the floodplain. The Commissary would be built next to the Base Exchange, but just outside of the floodplain. Figure 4-3 shows the proposed layout of the Shopping Center Complex. The existing Base Exchange and Commissary were flooded during Hurricane Katrina and are currently operating in temporary facilities that are not adequately sized to provide services necessary for the base.

In order to reduce the Air Force's overall mission risk, the Base Exchange and Commissary complex would be located on the highest ground possible along Meadows Avenue, so that as much of the facilities as possible are sited outside the floodplain. The Base Exchange and Commissary complex site is the only available area on base large enough to incorporate all the required structures and associated parking. Approximately 550,000 square feet of parking facilities and connecting roadways would be located within the floodplain, and approximately 120,000 square feet (approximately 80 percent) of the Base Exchange facility would be sited within the boundary of the floodplain.

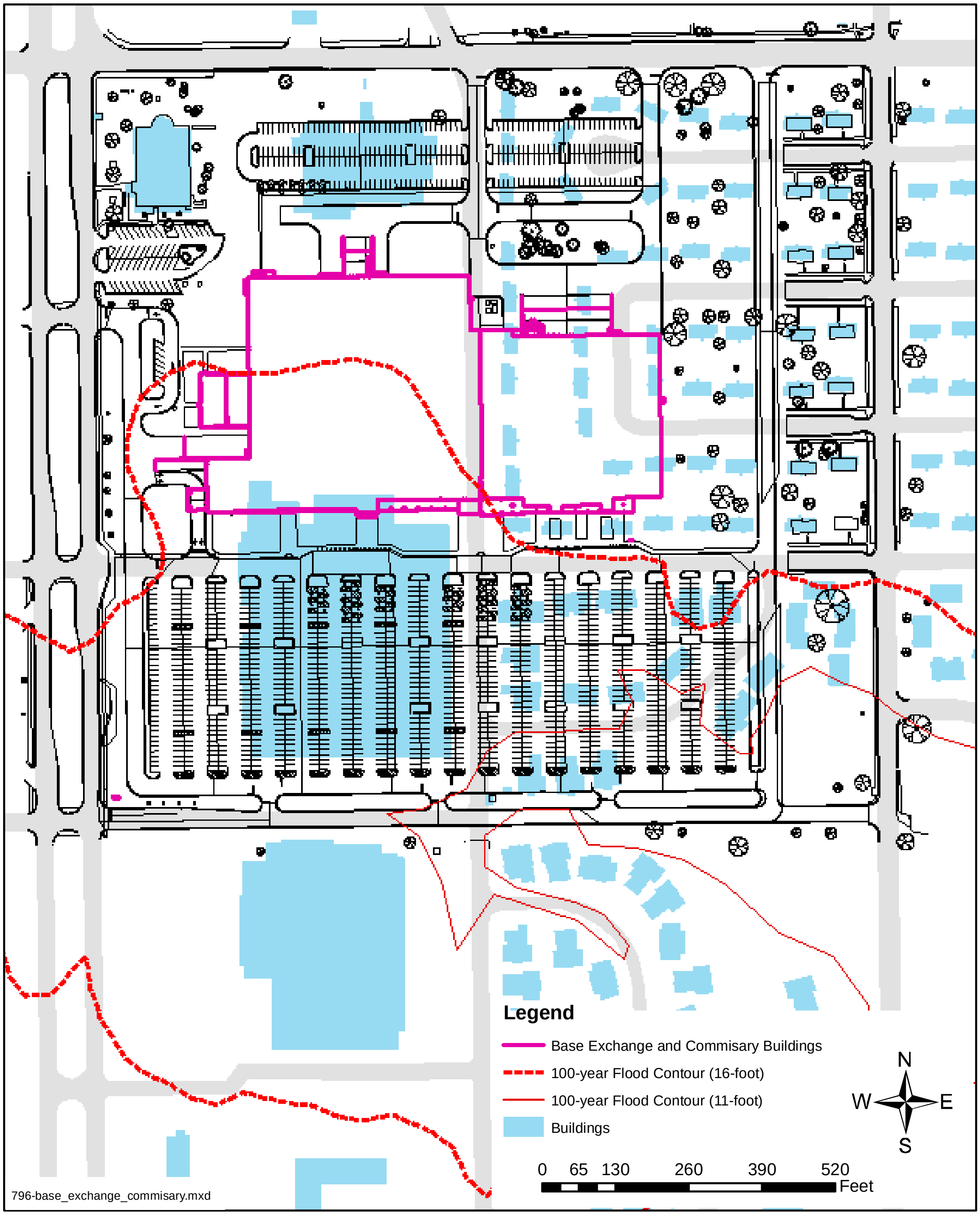

Figure 4-3 Base Exchange and Commissary Shopping Complex

The new Base Exchange facility would be built over the existing Base Exchange parking lot. The existing parking lot is currently located in the floodplain and has a higher elevation than the existing Base Exchange. In order to minimize the potential impact of the floodplain on the structure, the Base Exchange and Commissary complex would be constructed in a manner that would (1) raise the base floor elevation above the new 100-year floodplain (16-foot contour) and (2) protect the base of the foundation from erosion with appropriate safety margins. Vertical facilities would be sited outside the floodplain to the extent possible. The only other area large enough to accommodate the Base Exchange and Commissary complex is the current location of the existing Base Exchange facility, which was extensively damaged during Hurricane Katrina and is at an even lower elevation.

The area proposed for construction of the Shopping Center Complex is situated over the current Base Exchange and parking lots and is within the North Pinehaven housing area. Approximately 11.1 acres of impervious surfaces are associated with the existing structures and pavements within the floodplain. The proposed Base Exchange/Commissary projects would include approximately 15.4 acres of associated impervious surfaces within the floodplain, resulting in an increase of approximately 4.3 acres of impervious surfaces.

Increases in impervious surfaces act to increase discharge volume and speed of delivery of stormwater to nearby waterways. Replacement of vegetation with an impervious surface eliminates most potential for infiltration and also speeds up delivery of the stormwater to nearby drainage and stream channels in the absence of standard stormwater controls. An addition of approximately 4.3 acres of impervious surface to the floodplain would act to increase peak discharge volume and speed delivery of stormwater. The estimated increase in runoff volume using the Rational Method for a 24-hour period based on a 25-year 24-hour storm (USAF 1983) with a rainfall intensity of 11 inches per hour (NOAA 2006) is approximately 3.7 acre-feet.

BMPs would be implemented to structurally moderate the volume and slow the discharge of stormwater. Landscaping would be installed strategically in the proposed action project areas to increase infiltration capability. Possible modifications or additions to the current volume of stormwater retention structures would be evaluated in accordance with standard stormwater BMPs as part of the final design and installation of each individual project.

A NPDES General Construction Permit and associated SWPPP with BMPs would be required for each project grouping, and would include structural and programmatic controls to eliminate pollution from construction- and operational-related runoff. During the clearing, grading, and construction of facilities, erosion control BMPs would be employed to minimize erosion into nearby waterways on the site. These measures would include installation of silt fences or berms between waterways and the ongoing construction processes. Minimal adverse effects on structures and the floodplain would be expected by construction of the Base Exchange/Commissary Complex and associated parking and roadways in the floodplain due to the implementation of standard stormwater BMPs and sound engineering foundation design practices during the design and installation of these facilities.

Recreational Vehicle Park and Construction Camp

This project includes construction of an RV Park and Construction Camp in the Harrison Court area. The existing 52-unit RV Park in Thrower Park is scheduled for demolition as part of the overall MFH revitalization effort. The existing RV Park occupies land that is not within the new 100-year floodplain. The existing RV Park has never been able to expand even though there has been a demand for more camp space due to the limited available area in Thrower Park. Accordingly, the need for a larger RV Park with 186 units is needed at Keesler AFB. The RV Park would require approximately 30 acres and would be built in phases.

To minimize construction costs and provide the necessary area for the required 34 MFH units sited for the Thrower Park area, the existing location of the RV Park must be used for the MFH units. Figure 4-4 shows a proposed conceptual design of the new housing community in Thrower Park and the outline of the existing RV Park. If the existing RV Park location is not used, the required MFH units cannot be constructed within the project budget. An RV Park is a vital Morale, Welfare, and Recreation activity constructed to support military families. The preferred location for such an activity is near a major highway. The proposed RV Park would include 52 units that would later be expanded to include 186 units. Figure 4-5 shows a conceptual design for the RV Park in Harrison Court. Vertical facilities would be sited outside the floodplain to the extent possible in order to minimize potential obstructions to surface water runoff.

The construction of 1,067 MFH replacement units at Keesler AFB would also necessitate the construction of temporary housing for construction workers due to the severe shortage of a local construction work force. In order to complete this $300,000,000 construction effort, outside labor must be brought into the local community. However, as a result of Hurricane Katrina, short-term housing does not exist to support such a large labor work force. Therefore, temporary housing would be required to support the construction workforce. A Construction Camp would be needed to include concrete pads on which temporary housing trailers would be placed to provide housing for the construction work force. In order to minimize the financial burden of construction of a short-term housing camp, land would be provided by the Air Force to support the MFH construction effort and labor work force necessary to complete construction of the MFH units. If the Air Force cannot provide a site for short-term housing for construction workers, the MFH effort cannot be constructed within the current budget. As shown in Figure 4-5, a Construction Camp would be located south of the proposed RV Park and would occupy the area of land south of Desoto Avenue in Harrison Court. The Construction Camp would require an estimated 35.5 acres. Vertical facilities would be sited outside the floodplain to the extent possible in order to minimize potential obstructions to surface water runoff.

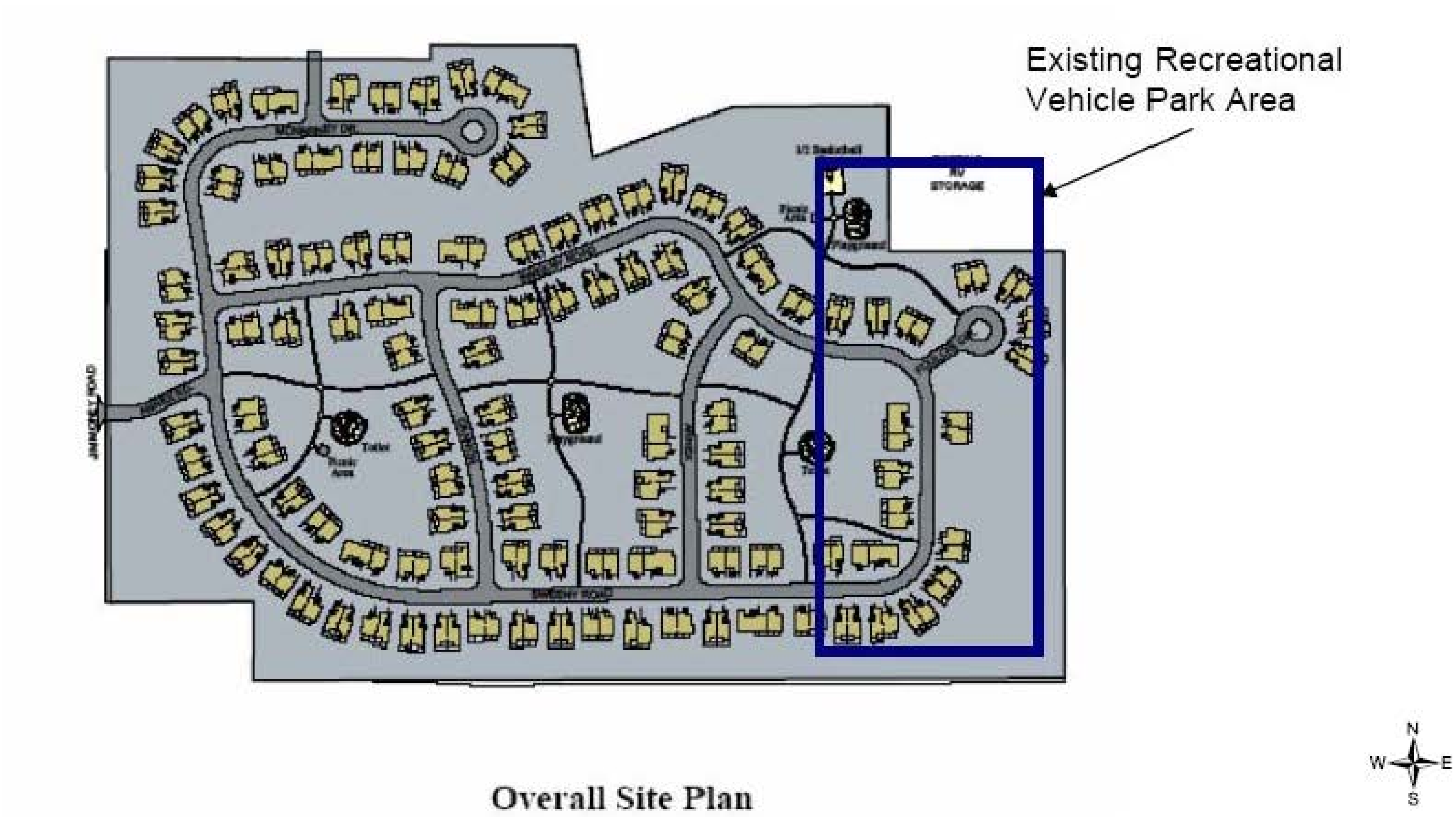

Figure 4-4 Existing Thrower Park Site Plan

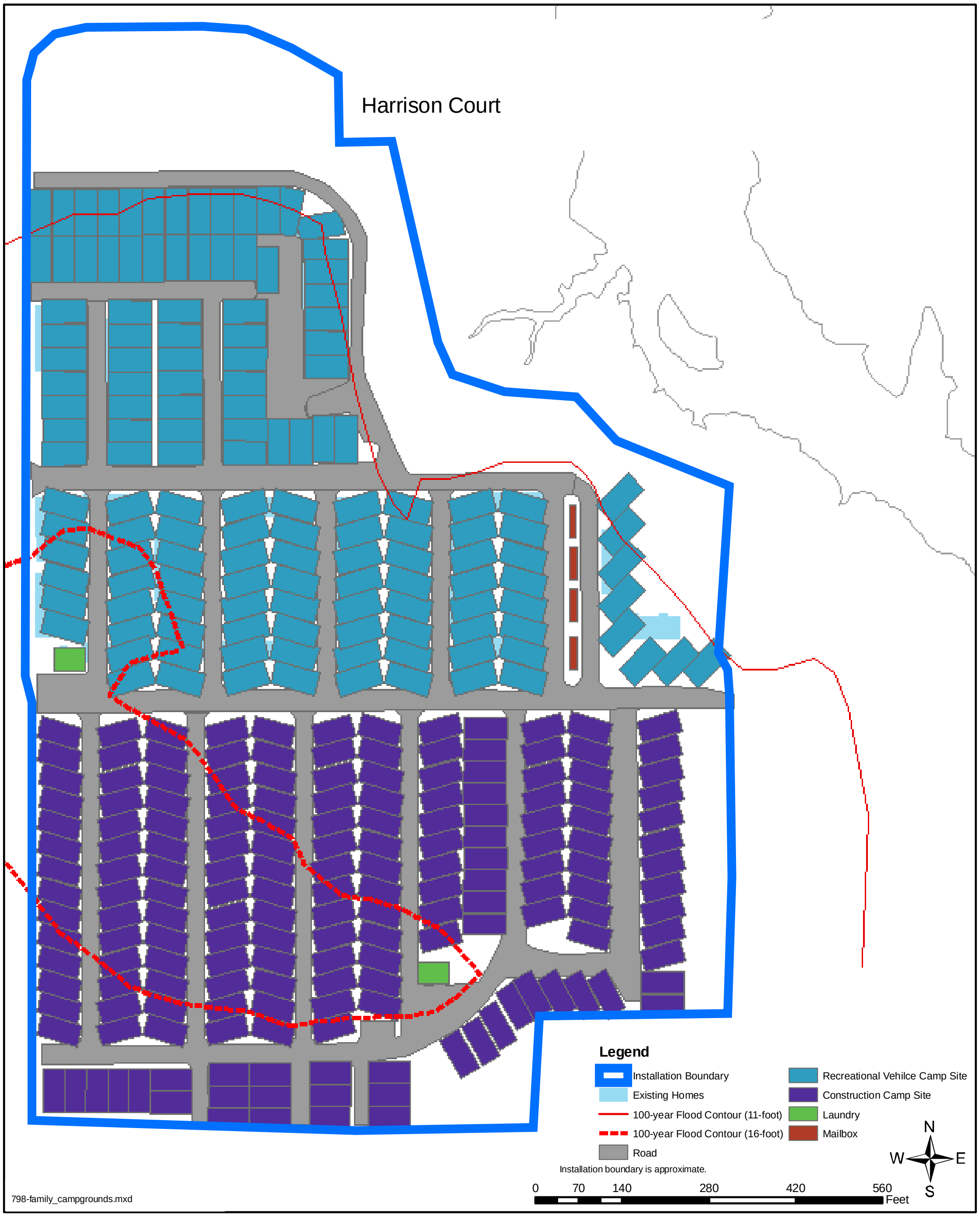

Figure 4-5 Recreational Vehicle Park and Construction Camp

The conceptual design for the RV Park and Construction Camp includes termination of the existing RV Park so that transfer to the new 52-unit RV Park would occur with little disruption. The Construction Camp would also be constructed to meet the housing requirements of the MFH construction work force. As construction of the MFH is completed and the Construction Camp is no longer required, the number of units in the Construction Camp would be phased down to provided the land needed for the remaining 134 RV Park units. The Construction Camp would require an estimated 35.5 acres and the expanded RV Park would require an estimated 29 acres.

Developable on-base locations were evaluated as part of the planning process for the proposed facilities, but areas of land large enough to accommodate the RV Park and Construction Camp have already been selected as sites for higher priority facilities in order to locate more critical missions outside the floodplain and at the highest possible elevation to minimize risk associated with flooding (e.g., Base Exchange/Commissary and Permanent Party Dormitory Complex). Only two alternate areas that could potentially support the requirements of the proposed RV Park and associated Construction Camp were identified. These alternate locations are the existing Oak Park housing community located north of the main base and the Harrison Court housing community located east of the base (Figures 4-6 and 4-7).

Oak Park is an approximately 60-acre housing area currently scheduled for demolition because it is no longer needed to support Keesler AFB's MFH requirements. It is bounded by non-military residential areas to the north and east and by Keesler AFB to the south and west. Of the 60 acres, 22.2 acres is located within the northern airfield clear zone; construction of any facilities is prohibited within this area. Approximately 11.7 acres of the Oak Park housing community fall within the new 100-year floodplain, and an additional 6.3 acres would be required to support the Medical Center's proposed new Central Energy Plant construction (Project 8). These areas are outlined on Figure 4-6.

Oak Park has 19.8 acres of land available that is not in the floodplain. There is an additional 11.7 acres available in the floodplain. However, the 19.8 acres available outside the floodplain cannot support the total long-term requirements for the RV Park or the short-term requirements for the Construction Camp. The Construction Camp requires 35.5 acres of land; therefore, the unrestricted 19.8 acres in Oak Park cannot support the total effort. While the 19.8 acres of land could support the initial 52-unit RV Park relocation, it could not support the future requirement of 186 units. An estimated 29 acres is required to support the long-term RV Park requirements.

There could be enough land for the 186-unit RV Park with the use of the 19.8 acres of land outside the floodplain and the 11.7 acres of land in the floodplain. However, an important consideration was given to the fact that this area borders a residential area in the City of Biloxi, which is zoned for single-family dwellings. The Air Force must maintain good public relations with the surrounding residents.

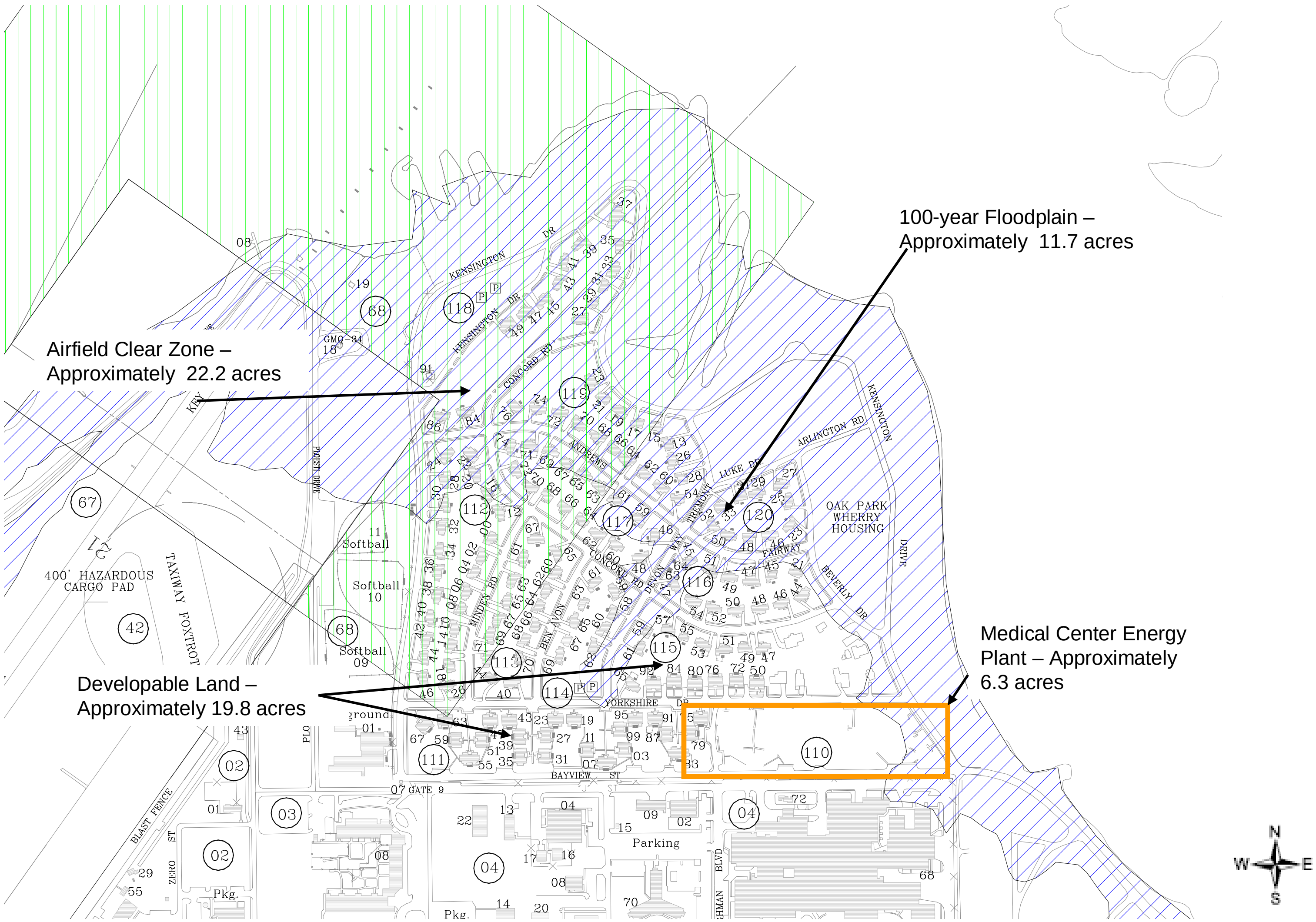

Figure 4-6 Oak Park Land Use Map

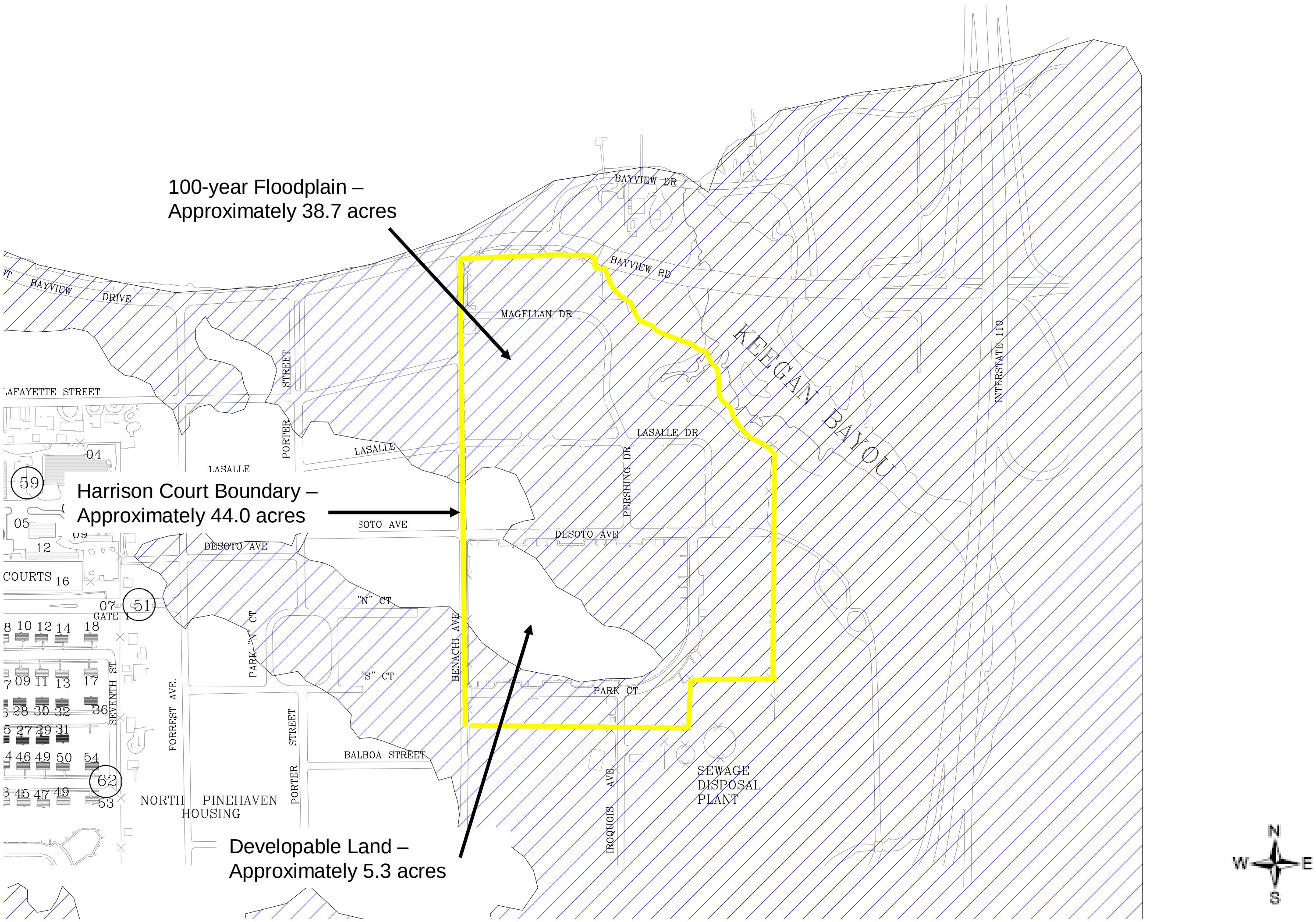

Figure 4-7 Harrison Court Land Use Map

Market analysis reveals that residential values are greatly tied to the land use activity around them, and construction of an RV Park next to residential properties could depreciate the value of the property. An RV Park located in the Oak Park area would most likely devalue the residential property of these Biloxians. The Oak Park area is also to be incorporated into the main base. An increase in traffic on base would also occur as a result of the RV Park being located in the Oak Park area, because there is limited access to the area from a major highway. Once the installation boundary fence is installed, the only way to access the RV Park would be to enter the base and travel at least a mile through the base to reach the site. The long-term development of Oak Park was also considered. The Oak Park area would include the incorporation of the area into the main base, and the most efficient use of this land would be to incorporate permanent structures that could be sited in the available 19.8 acres outside of the floodplain.

Similar to Oak Park, Harrison Court is currently an approximately 44-acre housing area scheduled for demolition because it is no longer needed to support Keesler AFB's MFH requirements. It is bounded to the east by a natural drainage area, to the north by a roadway and the Back Bay of Biloxi, to the west by commercial and private residential areas, and to the south by a sewage treatment plant and Department of Housing and Urban Development housing. Of the 44 acres, approximately 38.7 acres are located within the new 100-year floodplain. Approximately 5.3 acres are available for development outside the new 100-year floodplain.

Development of permanent vertical structures would be limited due to the increased area located within the new 100-year floodplain (16-foot contour). Only 5.3 acres would be available for development of permanent structures outside the floodplain, limiting the development options for this area. Harrison Court has enough land to incorporate the Construction Camp and initial RV Park, as well as the expanded RV Park after the Construction Camp is no longer needed. Harrison Court can be accessed from a major highway, eliminating the need to enter the main base and eliminating concerns regarding increased traffic and security throughout the main base.

Based on the total available land, access requirements, and residential concerns, the most suitable location for the Construction Camp and completed RV Park would be the Harrison Court area. The area proposed for construction of the RV Park and Construction Camp within Harrison Court is situated over residential housing and roadways. The housing demolition has been assessed as part of the ongoing revitalization of MFH project. Approximately 3.8 acres (excluding housing) of impervious surfaces are associated with the existing pavements within the floodplain. The proposed RV Park and Construction Camp project would include approximately 0.1 acres of vertical structures placed outside the floodplain and 20.8 acres of impervious surfaces within the floodplain, and would increase the impervious surfaces within the floodplain by approximately 17.1 acres.

Increases in impervious surfaces act to increase discharge volume and speed of delivery of stormwater to nearby waterways. Replacement of vegetation with an impervious surface eliminates most potential for infiltration and also speeds up delivery of the stormwater to nearby drainage and stream channels. An addition of approximately 17.1 acres of impervious surface to this area would act to increase the discharge volume of a 24-hour storm. The estimated increase in runoff volume using the Rational Method for a 24-hour period based on a 25-year 24-hour storm (USAF 1983) with a rainfall intensity of 11 inches per hour (NOAA 2006) is approximately 14.9 acre-feet. Stormwater runoff flows from Harrison Court into the Back Bay of Biloxi. An additional 14.9 acre-feet of water during a flood would elevate the surface of the 6,400 Big Lake by less than 0.1 inches.

The RV Park and Construction Camp would consist of concrete pads, mailbox, and laundry facilities. The current conceptual design indicates concrete pads (approximately 70 feet by 40 feet) would be required to provide adequate space for placement of RVs and temporary housing trailers. By reducing the size of the concrete pads in half and using gravel throughout the rest of the site, the amount of impervious surfaces could be significantly reduced.

BMPs would be implemented to structurally moderate the volume and slow the discharge of stormwater within the design of the RV Park and Construction Camp. Open spaces to the east of development would be maintained in the current state to help sustain infiltration capability. Possible modifications or additions to the current stormwater drainage structures would be evaluated as part of the final designs for the project. A NPDES General Construction Permit and associated SWPPP with BMPs would be required, including structural and programmatic controls for eliminating pollution from construction and operational-related runoff. During the clearing, grading, and construction of facilities, erosion control BMPs would be employed to minimize erosion into the nearby waterways. These measures would include installation of silt fences or berms between waterways and the ongoing construction processes. Minimal adverse effects would be expected by construction of the RV Park and Construction Camp facilities and pavements in the floodplain due to the implementation of standard stormwater BMPs during the design and installation of the facilities.

4.3.5.3.3 Alternative Action

Impacts to the floodplain would be the similar to those described for the proposed action. No additional construction in a floodplain was identified in the alternative action in addition to the three projects listed under the proposed action. Therefore, minimal adverse effects would be expected by the implementation of the alternative action.

4.3.5.3.4 Cumulative Impacts

Impacts from regional activities (road and bridge reconstruction and construction associated with recovery from Hurricane Katrina) would require the implementation of measures to reduce impacts to the floodplain. As part of the ongoing actions on base, the MFH revitalization effort would include demolition within the 100-year floodplain. It was determined in the MFH revitalization EA completed for the project that no adverse impacts to the utility of the floodplain areas would occur (USAF 2006a).

During construction of the ongoing projects both on and off base, appropriate construction BMPs would be employed to minimize potential runoff and sedimentation during construction activities and appropriate vegetation would be re-established. The increase in impervious surfaces as a result of the ongoing actions would require that the stormwater management systems be monitored and updated, as necessary, to accommodate increased runoff. Cumulative impacts to floodplains are expected to be minor given the implementation of standard stormwater BMPs during the design and installation of the facilities.

4.3.5.3.5 Measures to Reduce Impacts

A majority of the construction and demolition of facilities would be within previously disturbed areas. Vertical facilities would be sited outside the floodplain to the extent possible. The project would conform to City of Biloxi building code requirements regarding construction in a floodplain or flood hazard area and Mississippi Emergency Management Agency floodplain management guidance.

In order to minimize the potential impact of the floodplain on structures, the facility would be constructed in a manner that would raise the base floor elevation above the new 100-year floodplain (16-foot contour) and the base of the foundation would be protected from erosion with appropriate margins of safety implemented. BMPs would also be implemented to structurally moderate the volume and slow the discharge of stormwater runoff. Landscaping would be installed strategically in the proposed action project areas to increase infiltration capability. Possible modifications or additions to the current volume of stormwater retention structures would be evaluated as part of the final design for each individual project. Using gravel where possible would also minimize the impact of impervious surfaces to the floodplain by slowing the rate of discharge of stormwater and allowing more time for infiltration into the soil.

A NPDES General Construction Permit and associated SWPPP with BMPs would be required for each project grouping and include structural and programmatic controls to eliminate pollution from construction and operational-related runoff. During the clearing, grading, and construction of facilities, erosion control BMPs would be employed to minimize erosion into the nearby waterways on the site. These measures would include installation of silt fences or berms between waterways and the ongoing construction processes and would help to reduce any potential to impact floodplain areas given the implementation of standard stormwater BMPs during the design and installation of the facilities.

4.3.6 Hazardous Materials and Waste

CIP construction projects and BRAC demolition projects would be performed utilizing normal construction methods, which would limit the use, to the extent possible, of hazardous materials. Petroleum, oil, and lubricant (POL) products and other hazardous materials (e.g., paints) would be used during construction/renovation/demolition activities. These materials would be stored in the proper containers, employing secondary containment as necessary to prevent/limit accidental spills. All spills and accidental discharges of POLs, hazardous materials, or hazardous waste would be reported.

Keesler AFB has developed emergency response procedures and site-specific contingency plans for all hazardous materials and waste storage/generation locations. This information is incorporated into the installation’s Hazardous Material (HAZMAT) Emergency Planning and Response Compliance Plan (typically called the 705 Plan). The installation’s HAZMAT Planning Team plays an integral role in the development of the HAZMAT Plan to cover all emergency response contingencies. Applicable spill response procedures are also detailed in the Keesler AFB *Hazardous Waste Management Plan* (USAF 20044c).

Unless otherwise exempted by CERCLA regulations, the USEPA and MDEQ administer RCRA Subtitle C (40 CFR Parts 260 through 270) regulations applicable to the management of hazardous waste. Hazardous waste must be handled, stored, transported, disposed, or recycled in accordance with these regulations. There would be impacts to hazardous waste management if the federal action resulted in noncompliance with applicable federal and Mississippi regulations or caused waste generation that could not be accommodated by current Keesler AFB waste management capacities.

No impacts from hazardous materials and hazardous wastes are expected; the Air Force and developers would adhere to hazardous materials and hazardous waste management requirements and there would be no increase in the quantity of hazardous waste generated at Keesler AFB as a result of the alternatives.

4.3.6.1 No Action Alternative

No construction, renovation, or demolition activities would occur under the no action alternative. Therefore, no adverse impacts are expected under this alternative.

4.3.6.2 Proposed Action

No adverse impacts associated with hazardous materials/waste, ERP sites, ACM, LBP, or PCBs are anticipated under the proposed action, as standard operating procedures would be implemented as described in Section 4.3.6. Beneficial impacts would result from the removal of ACM and LBP materials in the older housing units.

4.3.6.3 Alternative Action

No adverse impacts associated with hazardous materials/waste, ERP sites, ACM, LBP, or PCBs are anticipated under the alternative action, as standard operating procedures would be implemented as described in Section 4.3.6. Beneficial impacts would result from the removal of ACM and LBP materials in the older housing units.

4.3.6.4 Cumulative Impacts

No adverse impacts associated with hazardous materials or waste have been identified with respect to the implementation of the proposed action or any of the alternatives. When considered with the other ongoing activities, these activities would not contribute to any cumulative impacts associated with hazardous materials and/or waste.

4.3.6.5 Measures to Reduce Impacts

No measures to reduce impacts would be required as part of the proposed action or alternatives

4.3.7 Biological Resources

4.3.7.1 Vegetation and Wildlife

4.3.7.1.1 No Action Alternative

No construction, renovation, or demolition activities would occur under the no action alternative. Therefore, no adverse impacts to vegetation and wildlife are expected under this alternative.

4.3.7.1.2 Proposed Action

Activities under the proposed action would occur within largely developed, maintained urban and suburban areas with a disturbed landscape. In compliance with the AETC Tree Conservation Policy, trees and shrubs would be retained to the greatest extent possible, and proposed removal of Heritage Trees would be coordinated with 81 CES/CEV (USAF 1997b). Use of BMPs during construction would minimize the potential for adverse effects to vegetation at and near construction sites, and there would be minimal impacts to native vegetation outside the developed regions of Keesler AFB. Since projects would occur in essentially urban or suburban areas, there would be no or minimal impacts to wildlife, with the exception of birds that associate with and nest on or in man-made structures.

4.3.7.1.3 Alternative Action

Potential impacts associated with the alternative action would be the same as those described in Section 4.3.7.1.2. The Air Force expects only negligible impacts to vegetation given the disturbed nature of the project landscape, the requirement for compliance with the AETC Tree Conservation Policy, and the use of BMPs during construction (USAF 1997b). Since projects would occur in essentially urban or suburban areas, there would be no or minimal impacts to wildlife, with the exception of birds that associate with and nest on or in man-made structures.

4.3.7.1.4 Cumulative Impacts

Localized loss of habitat or direct impacts to species can have a cumulative impact when viewed on a regional scale if that loss or impact is compounded by other events with the same end result. However, there would be no net loss of critical habitats at or around Keesler AFB, because projects for the proposed and alternative action would occur within developed areas of the base. The proposed or alternative actions would not have incremental effects on the vegetation and wildlife of Keesler AFB or the local area.

4.3.7.1.5 Measures to Reduce Impacts

No impacts to vegetation and wildlife are expected under the proposed or alternative actions. However, for the proposed and alterative action, trees and shrubs would be retained to the greatest extent possible, and proposed removal of Heritage Trees must be coordinated with 81 CES/CEV. Use of BMPs during construction would minimize the potential for adverse effects to vegetation at and near the construction sites.

4.3.7.2 Wetlands

4.3.7.2.1 No Action Alternative

No construction, renovation, or demolition activities would occur under the no action alternative. Therefore, no adverse impacts to wetlands are expected under this alternative.

4.3.7.2.2 Proposed Action

All projects would take place in locations designated as uplands, and therefore, no adverse impacts to wetlands are expected under this alternative. However, Keesler AFB would continue with the existing policy to conserve and protect the wetland habitat adjacent to the installation by 1) including all practicable measures to avoid and minimize impacts to wetlands caused by fill required by the proposed construction projects (pipelines and electrical cable trenching, building construction, and similar activities); 2) continuing to implement and enforce strict control of spills of hazardous materials; and 3) effectively managing stormwater runoff that might affect wetlands by updating and implementing various plans such as the Spill Prevention Control and Countermeasures (SPCC), SWPPP, and HAZMAT management plans.

4.3.7.2.3 Alternative Action

Potential impacts associated with the alternative action would be the same as those described in Section 4.3.7.2.2.

4.3.7.2.4 Cumulative Impacts

No wetlands exist within the main area of the base; the wetlands in the vicinity of Keesler AFB are located along the northern boundary of the base. When considered in the context of other ongoing actions in the ROI, the proposed action or alternatives (to include the no action alternative) would not have cumulative effects on these wetlands.

4.3.7.2.5 Measures to Reduce Impacts

No adverse impacts to wetlands are expected; however, Keesler AFB would continue good stewardship of wetland habitat adjacent to the installation by (1) including all practicable measures to avoid and minimize impacts to wetlands caused by fill required by the proposed construction projects (pipelines and electrical cable trenching, building construction, and similar activities); (2) continuing to implement and enforce strict control of spills of hazardous materials; (3) effectively managing stormwater runoff that might affect wetlands by updating and implementing various plans such as the SPCC, SWPPP, and HAZMAT management plans; (4) partnering with non-governmental conservation groups to routinely monitor wildlife and condition of vegetation within the adjacent Back Bay of Biloxi marshes; and (5) continuing to control encroachment of invasive species.

4.3.8 Utilities and Infrastructure

In evaluating impacts on infrastructure and utilities, several items were examined, including (1) the degree to which a utility service would have to alter operating practices and personnel requirements, (2) the degree to which the change in demands from implementation of the proposed action and alternatives would impact a system's capacity, (3) the degree to which a transportation system would have to alter operating practices and personnel requirements to support the action, (4) the capacity required from new or revised transportation systems, (5) the degree to which the increased demands from the proposed program would reduce the reliability of transportation systems, or aggravate already existing adverse conditions on base, and (6) the degree to which the proposed action and alternatives change surface water runoff characteristics and erosion characteristics. For the evaluation of potential impacts, the ROI for the infrastructure and utilities resource area encompasses Keesler AFB.

4.3.8.1 Electricity and Natural Gas

4.3.8.1.1 No Action Alternative

Under the no action alternative, there would be no demolition, construction, or mission related changes in activities. Therefore, there would be no effect on electricity and natural gas as described in Section 3.3.8.1.

4.3.8.1.2 Proposed Action

The proposed action would increase the interior building space by 194,410 square feet due to the combined Hurricane Katrina Recovery, CIP, and BRAC actions. No population changes are associated with the proposed action. The increase in building space represents an increase of approximately 1.5 percent over baseline conditions (approximately 12,285,581 square feet, Appendix B). As further described in Appendix B, a 1.5 percent increase in habitable building space is directly related to a similar increase in the demand for electrical and natural gas utilities serving those buildings.

The utility systems supporting electrical and natural gas services are capable of supporting a 1.5 percent increase in demand (Appendix B). Localized temporary service disruptions may occur during construction of new facilities, but would not constitute a permanent decrease in level of service (LOS).

4.3.8.1.3 Alternative Action

The alternative action would increase the interior building space by approximately 1.5 million square feet and would increase the base population by approximately 11,716 people (4,522 students, 1,178 on-base resident military dependents, 5,360 civilian and military personnel, and 656 overnight visitors). The increase in effective population is 8,289 24-hour equivalents (assuming all students, all dependents, and 221 military personnel live on base, all other personnel live off base, and assuming turnover in accompanied housing maximizes the number of dependents to one per bedroom). The increase in building space represents an increase of approximately 12.4 percent over the current value of 12,285,581 square feet (Appendix B). The 24-hour equivalent effective population increase of 8,289 is approximately 64 percent of the baseline effective population of 12,878 described in Appendix B.

As further described in Appendix B, a 12.4 percent increase in habitable building space is directly related to a similar increase in the demand for electrical and natural gas utilities serving those buildings. The utility systems supporting electrical and natural gas services are capable of supporting a 12.4 percent increase in demand (Appendix B). Localized temporary service disruptions may occur during construction of new facilities, but would not constitute a permanent decrease in LOS.

4.3.8.1.4 Cumulative Impacts

With the exception of the Revitalization of Housing effort, the efforts described in Section 2.7 are negligible in comparison to either the proposed action or the alternative action with respect to net changes in building space and population; therefore, the cumulative impacts to the existing electricity supply and natural gas distribution systems would be similar to those already described for the proposed action and alternative action. The privatization of the military housing areas prescribed by the Revitalization of Housing effort could ultimately result in a net positive effect on these base resources as the demand from approximately 4 million square feet of residential facilities would potentially be removed from the base systems (Appendix B). As further described in Appendix B, the existing utility supplies can accommodate anticipated demands associated with the proposed consumption increases. However, upgrades to individual electrical subsystems would be anticipated to coincide with implementation of the projects associated with the alternative action.

4.3.8.1.5 Measures to Reduce Impacts

Measures to reduce impacts for increased energy requirements would not be required for the proposed action and electrical subsystem replacements would be incorporated into the alternative action, as required.

4.3.8.2 Potable Water

4.3.8.2.1 No Action Alternative

Under the no action alternative, no demolition, construction, or mission related change in activity would occur. Therefore, there would be no effect on the potable water system as described in Section 3.3.8.2.

4.3.8.2.2 Proposed Action

The proposed action would not change the total base population from 2004 due to BRAC-related or other actions. The 24-hour equivalent effective service population would not change, and therefore, the anticipated demand for potable water would not appreciably change over the levels described in Section 3.3.8.2. Localized temporary service disruptions may occur during construction of new facilities, but would not constitute a permanent decrease in LOS.

4.3.8.2.3 Alternative Action

The alternative action would increase the base population by add approximately 11,716 people (4,522 students, 1,178 on-base resident military dependents, 5,360 civilian and military personnel, and 656 overnight visitors). The increase in effective population is 8,289 24-hour equivalents (assuming all students, all military dependents, and 221 military personnel live on base, all other personnel live off base, and assuming turnover in accompanied housing maximizes the number of dependents to one per bedroom). The 24-hour equivalent effective population increase of 8,289 is approximately 64 percent of the baseline effective population of 12,878 described in Appendix B. The increase in demand for potable water associated with these increases would be approximately 64 percent over the amount described in Section 3.3.8.2.

Localized temporary service disruptions may occur during construction of new facilities, but would not constitute a permanent decrease in LOS. As further described in Appendix B, the existing potable water system facilities and suppliers could accommodate anticipated demands associated with consumption increases of at least 64 percent based on current usage.

4.3.8.2.4 Cumulative Impacts

With the exception of the Revitalization of Housing effort, the efforts described in Section 2.7 are negligible in comparison to either the proposed or the alternative action with respect to net changes in building space and population; therefore, the cumulative impacts to the existing potable water distribution system would be similar to those already described for the proposed action and alternative action. The privatization of the military family housing areas proscribed by the Revitalization of Housing effort could ultimately result in a net positive effect on base resources as the original 1,820 units of residential housing facilities would be replaced by only 1,067 units, reducing demand on base systems (Appendix B). As further described in Appendix B, the existing potable water distribution facilities and supply could accommodate anticipated demands associated with the described consumption increases based on current usage.

4.3.8.2.5 Measures to Reduce Impacts

Measures to protect health and welfare would not be required for the proposed action or alternative. The available potable water supplies are capable of meeting the projected demand associated with the proposed action or alternative, provided the base supply wells and water storage and distribution infrastructure are maintained in accordance with capital improvements previously outlined in the 2001 *Drinking Water System Report* and in the 2004 *Potable Water Vulnerability and Risk Assessment Report* (USAF 2001c and 2004b) (Appendix B).

4.3.8.3 Solid Waste Management

There are several items considered in analyzing solid waste impacts. These items include evaluating the degree to which the proposed construction projects and demolition projects could affect the existing solid waste management program and capacities of the area landfills. Solid waste generated from the proposed construction activities would consist of building materials such as solid pieces of concrete, metals (e.g., conduit, piping, and wiring), and lumber. Analysis of the cumulative impacts associated with implementation of the proposed action and other actions is based on the following assumptions:

- Non-residential construction waste generation is 4.02 pounds (lbs) per square foot.
- Non-residential demolition waste generation is 173 lbs per square foot.
- Approximately 1 pound of construction debris is generated for each square foot of paving (USAF 2002).

It is important to note that any cut vegetation would not be added to the solid waste stream (dumpsters or roll-offs), but instead would be composted at Keeler AFB. (Note that during 2004, Keesler AFB composted approximately 538 tons of solid waste.) To the greatest extent possible, C&D waste would be recycled (especially wood, scrap metal, and wiring). Where feasible, Keesler AFB may reuse concrete material as riprap in spillways to prevent erosion. (Note that during 2004, Keesler AFB diverted/recycled approximately 1,576 tons of C&D debris.)

Coordination between Keesler AFB, waste contractors, developers, and local landfill operators prior to demolition or construction would minimize any potential impacts associated with disposal of C&D debris.

4.3.8.3.1 No Action Alternative

Under the no action alternative, there would be no demolition, construction or mission related changes in activities. Therefore, there would be no effect on solid waste disposal resources as described in Section 3.3.8.3.

4.3.8.3.2 Proposed Action

The proposed action involves the construction of approximately 2,228,550 square feet of building space, and the construction of 1,333,000 square feet of pavements (figures used in these calculations have been rounded to the nearest multiple of five; they do not exactly match the demolition and construction figures given in Section 2). This action also involves the demolition of approximately 2,230,140 square feet of building space. The estimated quantity of C&D debris that would be generated as a result of these activities is shown in Table 4-5

Table 4-5 Estimated Construction and Demolition Debris Generated by Proposed Action

Project Year	Construction			Demolition		Total
	Buildings (square feet)	Pavements (square feet)	Debris (tons)	Debris (square feet)	Debris (tons)	Debris (tons)
1	445,710	266,600	1,029	446,028	38,581	39,611
2	445,710	266,600	1,029	446,028	38,581	39,611
3	445,710	266,600	1,029	446,028	38,581	39,611
4	445,710	266,600	1,029	446,028	38,581	39,611
5	445,710	266,600	1,029	446,028	38,581	39,611
Total	**2,228,550**	**1,333,000**	**5,146**	**2,230,140**	**192,905**	**198,053**

Notes:
Nonresidential construction waste generates approximately 4.02 pounds per square foot.
Approximately 1 pound of construction debris waste is generated per square foot of paving.

Over the five-year period of the proposed action development project, it is estimated that the total quantity of the debris generated from construction and demolition activities would be 198,053 tons. The annual quantity of debris generated during construction, renovation, and demolition under the proposed action was compared to the average annual amount of waste received at regional landfills that accept C&D waste in 2005, as shown in Table 4-6 (recycling by Keesler AFB would reduce the total amount of C&D debris.).

Table 4-6 Estimated Increase in Construction and Demolition Debris at Local Landfills under the Proposed Action

Landfill Sites	2005 Waste Received (tons/year)	2005 Landfill Life (years)	2005 Total Capacity (tons)	Total Construction and Demolition Debris for Proposed Action	Total Landfill Capacity Remaining (tons)	Landfill Life Remaining after Proposed Action (years)
Pecan Grove Landfill	407,128	28	11,399,584	198,053	11,201,531	27.5
Coastal Recycling Rubbish Site	151,094	11	1,662,034	198,053	1,463,981	9.7
Blackmer Rubbish Site I	104,803	6	628,818	198,053	430,765	4.1
Blackmer Rubbish Site II	7,321	10	73,210	198,053	NA	NA
Combined Landfills	**670,346**	**55**	**36,869,030**	**198,053**	**36,670,977**	**54.7**

Notes:
Construction and demolition debris will likely be distributed among all landfill sites. The table illustrates what would happen if one site received all the construction and demolition debris over the course of 5 years.
NA indicates that it is not applicable to report negative values in this instance because the waste will be sent to more than one landfill.

If all C&D debris were landfilled at Pecan Grove Landfill (Keesler AFB's primary C&D debris recipient), the life of the landfill reported in 2005 would be reduced by two years. However, it is unlikely that all the C&D debris would be disposed of at only one landfill. Distribution of C&D debris to the Coastal Recycling Rubbish Site and the Blackmer Rubbish Sites would minimize the potential for adverse impacts on individual landfills.

4.3.8.3.3 Alternative Action

The alternative action involves the construction of approximately 4,040,885 square feet of building space with an accompanying 53.4 acres of pavements (including roadways, sidewalks, and parking areas). This action also involves the demolition of approximately 2,518,380 square feet of building space. The quantity of C&D debris that would be generated as a result of these activities is estimated in the Table 4-7.

Over the five-year period of the alternative action, it is estimated that the total quantity of the debris generated from construction and demolition activities would be 227,125 tons. The annual quantity of debris generated during construction, renovation, and demolition under the alternative action was compared to the average annual amount of waste received at regional landfills that accept C&D waste, as shown in Table 4-8 (recycling by Keesler AFB would reduce the total amount of C&D debris.)

Table 4-7 Estimated Construction and Demolition Debris Generated by Alternative Action

Project Year	Construction			Demolition		Total
	Buildings (square feet)	Pavements (square feet)	Debris (tons)	Debris (square feet)	Debris (tons)	Debris (tons)
1	808,177	465,221	1,857	503,676	43,568	45,425
2	808,177	465,221	1,857	503,676	43,568	45,425
3	808,177	465,221	1,857	503,676	43,568	45,425
4	808,177	465,221	1,857	503,676	43,568	45,425
5	808,177	465,221	1,857	503,676	43,568	45,425
Total	**4,040,885**	**2,326,105**	**9,285**	**2,518,380**	**217,840**	**227,125**

Notes:
Nonresidential construction waste generates approximately 4.02 pounds per square foot.
Approximately 1 pound of construction debris waste is generated per square foot of paving.

Table 4-8 Estimated Increase in Construction and Demolition Debris at Local Landfills under the Alternative Action

Landfill Sites	2005 Waste Received (tons/year)	2005 Landfill Life (years)	2005 Total Capacity (tons)	Total Construction and Demolition Debris for Proposed Action	Total Landfill Capacity Remaining (tons)	Landfill Life Remaining after Proposed Action (years)
Pecan Grove Landfill	407,128	28	11,399,584	227,125	11,172,459	27.4
Coastal Recycling Rubbish Site	151,094	11	1,662,034	227,125	1,434,909	9.5
Blackmer Rubbish Site I	104,803	6	628,818	227,125	401,693	3.8
Blackmer Rubbish Site II	7,321	10	73,210	227,125	NA	NA
Combined Landfills	**670,346**	**55**	**36,869,030**	**227,125**	**36,641,905**	**54.7**

Note:
Construction and demolition debris will likely be distributed among all landfill sites. The table illustrates what would happen if one site received all the construction and demolition debris over the course of 5 years.
NA indicates that it is not applicable to report negative values in this instance because the waste will be sent to more than one landfill.

If all C&D debris were landfilled at Pecan Grove Landfill (Keesler AFB's primary C&D debris recipient), the life of the landfill reported in 2005 would be reduced by one year. It is unlikely that all the C&D debris would enter only one landfill. Distribution of C&D debris to the Coastal Recycling Rubbish Site, and the Blackmer Rubbish sites would minimize the potential for adverse impacts on an individual landfill.

4.3.8.3.4 Cumulative Impacts

The ongoing actions in the ROI involve the construction of approximately 3,915,391 square feet of building space and approximately 4,785,610 square feet of building space demolition. Over a five-year lifetime, it is estimated that the total quantity of debris generated from construction and demolition activities associated with the ongoing actions would be of the approximately 421,825 tons. When considered with respect to the proposed action and alternative actions, impacts would be comparatively minimal on landfill capacity given the massive restoration effort taking place along the Gulf Coast as a result of Hurricane Katrina.

4.3.8.3.5 Measures to Reduce Impacts

The following BMPs would be followed to reduce impacts caused by solid waste generated by the proposed action and alternative action: (1) recycling and reuse of C&D debris (to the extent practicable), and (2) distribution of C&D debris among the five local landfills Mississippi monitors landfills on an annual basis. As the life expectancy of a landfill grows shorter, the state of Mississippi determines the need for either providing a new landfill or routing waste to landfills in the surrounding area (MDEQ 2006). Recycling and reuse of C&D debris would limit adverse and/or cumulative impacts to local landfills to the extent practicable, thus helping to increase the life of the area landfills.

4.3.8.4 Wastewater

4.3.8.4.1 No Action Alternative

Under the no action alternative, there would be no demolition, construction, or mission related changes in activities. Therefore, there would be no effect on wastewater as described in Section 3.3.8.4

4.3.8.4.2 Proposed Action

The proposed action would have no effect on the total base population from 2004 due to BRAC-related or other actions. The 24-hour equivalent effective service population would not change, and generation of wastewater would not appreciably change over the levels described in Section 3.3.8.4. Localized temporary service disruptions may occur during construction of new facilities, but would not constitute a permanent decrease in LOS.

4.3.8.4.3 Alternative Action

The alternative action would increase the base population by approximately 11,716 people (4,522 students, 1,178 on-base resident military dependents, 5,360 civilian and military personnel, and 656 overnight visitors). The increase in effective population is 8,289 24-hour equivalents (assuming all students, all military dependents, and 221 military personnel live on base, all other personnel live off base, and assuming turnover in accompanied housing maximizes the number of dependents to one per bedroom). The

24-hour equivalent effective population increase of 8,289 is approximately 64 percent of the baseline effective population of 12,878 described in Appendix B. The amount of wastewater generation would increase by approximately 64 percent over the amount described in Section 3.3.8.4.

Localized temporary service disruptions may occur during construction of new facilities, but would not constitute a permanent decrease in LOS. As further described in Appendix B, the existing wastewater collection system facilities could accommodate anticipated demands associated with increased generation of at least 64 percent based on current rates.

4.3.8.4.4 Cumulative Impacts

With the exception of the Revitalization of Housing effort, the efforts described in Section 2.7 are negligible in comparison to either the proposed or the alternative action with respect to net changes in building space and population and therefore the cumulative impacts to the existing wastewater collection system would be similar to those already described for the proposed and alternative actions. The privatization of the military family housing areas prescribed by the Revitalization of Housing effort could ultimately result in a net positive effect on base resources because the original 1,820 units of residential housing facilities would be replaced by only 1,067 units, decreasing demand on base utility systems (Appendix B). As further described in Appendix B, the existing wastewater collection system could accommodate anticipated increased generation associated with the proposed action and alternative actions.

4.3.8.4.5 Measures to Reduce Impacts

Measures to protect health and welfare would not be required for the proposed action or alternative. The present state of the force mains and lift stations limits the wastewater collection system to a maximum flow of 3.24 mgd; however, there is sufficient headroom in the current system to accommodate future demand. The 2004 *General Plan* mentions that infiltration issues and lift station upgrades are factors that would need to be quantified and addressed as required during implementation of planned improvements to the base. Additional information on wastewater collection system capabilities and requirements are presented in Appendix B.

4.3.8.5 Transportation

4.3.8.5.1 No Action Alternative

Under the no action alternative, there would be no increase in personnel or mission activity at Keesler AFB and there would be no construction or demolition accomplished in support of the Hurricane Katrina Recovery projects, the CIP, or the BRAC program as it relates to Keesler AFB. Consequently, baseline transportation conditions as described in Section 3.3.8.5 would remain unchanged and no transportation impacts would occur beyond those associated with ongoing activities and approved actions.

4.3.8.5.2 Proposed Action

Under the proposed action, no additional personnel would be added to Keesler AFB. Therefore, no additional traffic would be created and conditions would remain close to the current baseline.

Implementation of the proposed action would require delivery of materials to and removal of construction-related debris from construction and demolition sites. This could result in minor to moderate traffic congestion on and off base. However, construction traffic would make up only a small portion of the total existing traffic volume in the area and at the base. Increased traffic during construction could contribute to increased congestion at gates and in the processing of access passes. The potential for short-term increases in traffic are not likely to substantially affect commute times. This congestion would be short-term, and would cease upon completion of the projects. No long-term impacts to on- or off-base transportation systems would result.

Several projects under the proposed action include roadway improvements as elements of the project. When completed, these projects would have a positive impact to transportation at Keesler AFB. The projects and their potential benefits are presented below.

Headquarters Area Development

Part of the new Headquarters Campus would involve the construction of a traffic roundabout at the intersection of General Chappie James Avenue, First Street, and Phantom Drive as shown in the *General Plan* (USAF 2004a). This would serve to improve traffic flow and safety through this major three-way intersection.

Training Vision Area Development and Triangle Vision Area Development

Currently students often conduct group walks (eight abreast) on the existing road network within the base. As part of the Training and Triangle Vision Area developments, a series of "troopwalks" would be developed to link the training campus together with the student campus and support facilities as shown in the *General Plan* (USAF 2004a). These troopwalks would be independent of the road network so that both cars and pedestrians could move safely and efficiently.

Industrial Area Development

New development in the Industrial Area would involve several projects with transportation impacts as shown in the *General Plan* (USAF 2004a). The existing Larcher Gate would be moved to the north approximately 200 feet and be designated as the Commercial Gate to the base (not a project associated with the proposed action; to be implemented per the *General Plan* [USAF 2004a]). The main impact would be to improve safety by providing greater queuing distance between the gate and the CSX railroad/Irish Hill Drive. Also as a result of the relocation of the gate, M Street would no longer have direct access to Larcher Boulevard, which would improve safety and provide better traffic movement.

Improvements are also planned to shift traffic at the Judge Sekul Gate from L Street to General Chappie James Avenue. This would be accomplished with horizontal switch back curves. The new switch back road would have two lanes for incoming traffic, one lane for existing traffic and it would include a new gatehouse and point-of-contact booth. The tie-in point of Ploesti Drive extension to L Street would also be moved south approximately 200 feet on Larcher Boulevard. The positive impact of this realignment would be to improve mobility and safety by increasing the separation between the primary and secondary roads.

General Chappie James Avenue would be improved from a secondary road to a primary roadway. Between Larcher Boulevard and Z Street, the roadway would be widened 12 feet to support four lanes of traffic. To the west of Z Street, it would remain a two-lane street terminating at the proposed roundabout that would also serve First Street and Phantom Street. Making General Chappie James Avenue a primary roadway would improve the traffic flow for motorists that use the road to access the Headquarters areas, flightline area, and a large portion of parking in the Training Area.

General Area Development

The main impact to on-base transportation from general area development would result from the new Main Gate/Visitor's Center and Division Street improvements (Figure 4-2). The new Main Gate would be located along a new access road that would be an extension of Division Street west to a tie in with Larcher Boulevard. The existing Meadows Gate would be replaced with this new gate. Judge Sekul Gate would continue to be used to accommodate traffic during peak travel hours. The new Main Gate access road off Division Street would be a four-lane divided boulevard.

Construction of the new Main Gate and Visitor's Center would result in additional traffic on Division Street from IH-110 and Porter Avenue from US 90. To help reduce impacts from the increased traffic, improvements would be required along Division Street and the IH-110 exit and entrance ramps that tie into Division Street. The IH-110 ramps should be expanded one lane in width to allow for dual right turn lanes exiting the highway and dual left turn lanes entering the highway. A second left turn lane would also be required for eastbound Division Street vehicles at the IH-110 entrance ramp intersection.

Division Street between IH-110 and Forrest Avenue would be upgraded to a major arterial street. This would be accomplished by widening the roadway by approximately 10 feet and restriping to five lanes (two lanes in each direction and a shared center turn lane). A traffic signal would replace the current four-way stop at the intersection of Division Street and Porter Avenue. At the intersection of Division Street and Forest Avenue, Division Street would have the right of way and Forest Avenue would be controlled in both directions by stop signs.

4.3.8.5.3 Alternative Action

A comprehensive transportation study has not been conducted by Keesler AFB and only limited transportation data is available. Although some actual traffic volume data for the base gates is available, it does not allow for a detailed assessment. As a result, key assumptions were made to project the potential impacts to traffic that would be associated with the alternative action. For the purposes of analysis, traffic is assumed to increase proportionally with the increase in base population associated with the alternative action. Based on this assumption, there would be an increase in traffic over baseline conditions. As a result of this population increase, more people would be required to access Keesler AFB on a routine basis. This could result in a small increase in the amount of congestion that generally occurs at the gates during the morning and evening workday rush hours. In addition to the increase in personnel, there would also be a small increase in military dependent and commercial traffic. This small increase could have a minor impact on daily traffic.

In addition to the increase in base population, the alternative action would include construction and demolition projects similar to those described for the proposed action. Therefore, potential construction related transportation impacts would be similar to those described in Section 4.3.8.5.2.

4.3.8.5.4 Cumulative Impacts

Transportation within the ROI may experience slight, localized short-term negative impacts during the proposed construction and demolition activities from the increase in heavy equipment and contractor vehicles. However, impacts would be minimized by the short operating period associated with each project.

Cumulative impacts to transportation as a result of the proposed or alternative action in combination with other projects in the Biloxi area would be expected to be positive over the long-term because they would enhance the flow of traffic on, to, and off the base. Several projects within the vicinity of the base include roadway improvements (see Section 2.7.2.1).

4.3.8.5.5 Measures to Reduce Impacts

Interim measures to minimize any short-term impacts have been defined as part of the proposed action and alternative action. Therefore, no other measures to reduce impacts would be required.

4.3.8.6 Stormwater Drainage

4.3.8.6.1 No Action Alternative

Under the no action alternative, there would be no demolition or construction projects; therefore, there would be no effect on stormwater drainage as described in Section 3.3.8.6.

4.3.8.6.2 Proposed Action

Under the proposed action, several facilities would be constructed and demolished at Keesler AFB. Table 2-1 details the total area associated with each project (including multi-story facilities). Building space typically includes multiple floors and does not add directly to pavements to provide impervious surfaces. Impervious surfaces are determined by building footprints and the pavements surrounding them. Based on analysis of the project list, approximately 76 acres of new construction and 35 acres of associated demolition would occur. A total of 28 acres of impervious cover would be added to the installation. This is expected to have a minimal impact on the total amount of impervious cover (4.6 percent increase) and on the total volume of stormwater runoff (2.1 percent or 24.4 acre-feet additional runoff in 24 hours) and would not impact existing capacity of the stormwater drainage systems. Additionally, new site-specific stormwater drainage would be designed, engineered, and implemented at each project location to move stormwater efficiently into the overall drainage system.

In accordance with the installation's SWPPP, BMPs (including techniques such as berms, sediment traps, silt fences, and windbreaks) would be implemented to minimize any runoff and subsequent degradation of surface water quality. The SWPPP would address all the elements of the proposed action before initiating activities. The plan would include erosion and sediment control techniques that would be used during demolition and construction to minimize erosion. In addition, the USEPA's NPDES program requires that an NOI be filed under the USEPA-administered Construction General Permit. Adequate control of runoff and erosion must also be demonstrated at each site. Therefore, water quality would not be adversely impacted by the proposed action.

4.3.8.6.3 Alternative Action

Under the alternative action, a total of 85 acres of new impervious cover would be added to the installation. This is expected to have a minimal impact on the total amount of impervious cover (14 percent increase) and on the total volume of stormwater runoff (6 percent or 74 acre-feet of additional runoff in 24 hours) and would not impact the existing capacity of the stormwater drainage systems. The kind and duration of construction activities associated with the alternative action would be similar to those identified under the proposed action. The construction and demolition activities would be conducted consistent with the requirements of the NPDES stormwater program, as described in Section 4.3.8.6.2. Therefore, no significant adverse water quality impacts are anticipated.

4.3.8.6.4 Cumulative Impacts

The proposed and alternative actions, when considered with respect to other ongoing actions, would have a minimal net cumulative impact on stormwater at Keesler AFB when compared to the whole installation. The proposed and cumulative actions would increase impervious cover by 4.8 percent (29 acres) and 14.2 percent (86 acres) for the alternative and cumulative actions. Total runoff for the proposed and cumulative actions would increase by 2.14 percent (25.3 acre-feet of additional runoff in 24 hours) and 6.1 percent (74.9 acre-feet of additional runoff in 24 hours) for the alternative and cumulative actions. Sediment erosion would be controlled using BMPs during construction and demolition, negating large-scale adverse effects on surface waters. Therefore, minor cumulative impacts would be expected on stormwater resources.

4.3.8.6.5 Measures to Reduce Impacts

Impacts on stormwater resources from the proposed action and alternative actions are minimal when compared to the whole installation. However, BMPs should be used to reduce or eliminate runoff or contamination into stormwater conveyances. Site-specific sediment and erosion control plans with detailed BMPs to prevent soil disturbance, capture and contain loose soil, and slow the movement of stormwater during heavy rains should be included in the project development. The cumulative addition of approximately 74.9 acre-feet of stormwater detention facilities across Keesler AFB may be considered as a stormwater management BMP for good stewardship of the common watersheds shared with neighboring facilities and residences.

4.3.9 Socioeconomics and Environmental Justice

In order to assess the potential socioeconomic impacts of the proposed action, demographic and economics characteristics at Keesler AFB, the City of Biloxi, and the Biloxi-Gulfport-Pascagoula MSA were analyzed, as presented in Section 3.3.9. Potential socioeconomic consequences were assessed in terms of effects of the proposed actions on the local economy, typically driven by changes in project personnel or expenditure levels. Economic multipliers, migration ratios, and other factors are utilized to determine the total economic effect of project-related changes on regional socioeconomic attributes.

For this environmental assessment, potential socioeconomic impacts are evaluated for factors associated with Hurricane Katrina Recovery and Installation Development proposal at Keesler AFB, including facility modifications and personnel changes. Personnel changes associated with the action alternatives result in population increases in the region, and related changes in housing and service demand, and induced employment and income. Construction activity associated with facility modifications on base often generates temporary economic benefits to the region in terms of employment and income; however, these benefits last only for the duration of the construction period.

4.3.9.1 No Action Alternative

Under the no action alternative, there would be no increase in personnel at Keesler AFB, and no construction, renovation, demolition, or mission increase. Population on base and in the ROI would not be affected. In addition, the construction-related employment and earnings impacts associated with the proposed action would not occur. No impacts to socioeconomic resources would occur under implementation of the no action alternative.

4.3.9.2 Proposed Action

Under the proposed action, Keesler AFB would implement Hurricane Katrina Recovery projects involving about 1 million square feet of new construction and CIP projects involving 1.2 million square feet of new construction. As stated in the methodology section above, construction activities associated with facility development under the proposed action would generate a number of jobs during the construction period, and contribute to local earnings and induced spending. These effects would be temporary, however, only occurring for the duration of the construction period. Due to last year's hurricane evacuations, the lack of available lodging for potential workers, and ongoing construction activities in the region associated with hurricane recovery, there is an acute labor shortage in the region that is expected to continue for some time. Planned Hurricane Katrina Recovery and CIP projects at Keesler AFB would place added pressure on the construction sector in the short term.

Distribution systems and inventories of building materials were damaged or destroyed by the hurricane, resulting in higher estimated building costs due to the shortage of supplies and labor. Preliminary estimates indicate rebuilding costs are substantially higher in 2006, but will stabilize over time as residents return to the region and workers are lured by high wages (Holtz-Eakin 2005). It is unlikely, however, that adequate labor resources would be available in the short term to fulfill the needs of the proposed project.

Personnel levels at Keesler AFB are not expected to change under the proposed action; therefore, no effects to regional demographics are anticipated. Demand for housing and relative community services would be unaffected.

4.3.9.3 Alternative Action

Under the alternative action, Keesler AFB would be developed to the potential identified in the *Capability Analysis* (see Appendix B). It is estimated that the base could accommodate an additional 4 million square feet of new building construction, including the Hurricane Katrina Recovery and CIP projects described under the proposed action. The net gain in building space under the alternative action would be 1.5 million square feet involving a net increase of 62.4 acres of impervious surfaces. Construction activities associated with facility development would be similar to those described under the proposed action, although somewhat greater in magnitude due to the increased development capacity proposed.

Under the alternative action, Keesler AFB could accommodate an additional 5,360 military and civilian personnel, 4,522 students, 3,759 military dependents, and 656 transient personnel, resulting in a total increase in direct population of 14,297 persons. This level of growth represents an increase of 62.4 percent from the baseline population of 22,907 persons to the projected maximum sustainable population of 37,204 persons (see Note in Table 4-9). An increase of this magnitude constitutes 28.5 percent of the 2005 Biloxi population of 50,209 persons, and 3.8 percent of the Biloxi-Gulfport-Pascagoula MSA population.

Table 4-9 Keesler AFB Sustainable Capacity Direct Population Impacts

	Living On Base	Living Off Base	Total
Military/Civilian Personnel	2,267	13,124	15,391
Military Dependents	3,506	7,287	10,793
Student Personnel	8,998	0	8,998
Transient Personnel	2,022	0	2,022
Total Sustainable Direct Population	**16,793**	**20,411**	**37,204**

Note: Population impacts in this socioeconomic analysis differ from those presented in Section 2.6.1 and the *Capability Analysis* in that the number of military dependents living off base are estimated and included. This number is estimated by applying current military-to-civilian personnel ratios and military dependent ratios.

Source: see Appendix B

Movement of additional personnel to Keesler AFB could affect the housing market and public services, particularly in the area immediately surrounding the base. While the influx of population associated with Keesler AFB could help offset population losses in the aftermath of Hurricane Katrina, it is not clear whether sufficient housing and infrastructure would be in place and available to accommodate expected growth. Potential socioeconomic affects could be experienced in the housing market and to community services such as schools, medical care, law enforcement, and others. Consequently, implementation of the alternative action would add to the redevelopment stress already experienced in the area. However, the potential influx of military personnel and their families, in an area already accustomed to a strong military presence, could bolster local and regional revitalization efforts.

4.3.9.4 Cumulative Impacts

Recovery efforts associated with Hurricane Katrina's destruction has produced a great need for skilled construction labor to assist with rebuilding activities in the region. Although there are beneficial economic effects from planned construction projects, in the short term these activities would add to the existing shortage of skilled laborers in the region, posing potential negative impacts to local communities attempting to rebuild. It is unlikely that housing in the local community would be available in the short term for temporarily displaced military families and to accommodate potential in-migrating workers.

4.3.9.5 Measures to Reduce Impacts

Potential socioeconomic impacts associated with implementation of the proposed action are related to added pressure on the construction industry. These impacts would not change the nature of the economic conditions already being experienced in the region due to hurricane recovery activity. As a result, no specific measures to reduce impacts are identified under the proposed action.

Under implementation of the alternative action, the proposed influx of personnel and dependents to the region could affect local housing markets and community services.

Coordination with the City of Biloxi and area school districts would help ensure school capacity is available to accommodate projected incoming population.

4.3.10 Air Quality

4.3.10.1 Methodology

Project generated air emissions were analyzed to determine if:

- There would be a violation of a NAAQS.
- Emissions would contribute to an existing or projected air quality violation.
- Sensitive receptors would be exposed to substantial pollutant concentrations.
- There would be an increase of 10 percent or more in Harrison County criteria pollutants emissions.
- Any significance criteria established by the Mississippi SIP would be exceeded.
- A permit to operate would be required.
- A change to the Title V permit would be required.

Under existing conditions, the ambient air quality in Harrison County is classified as attainment for all national ambient air quality standards as defined in 40 CFR 50.

Mississippi has developed a SIP as required by Section 110 of the CAA to provide for the implementation, maintenance, and enforcement of the NAAQS for each air quality region within the state. The SIP is the primary vehicle used by USEPA for enforcement of federal air pollution legislation.

Section 176(c) of the CAA provides the basis for the relationship between the SIP and federal projects. It states that no federal agency shall support or approve any activity or action that does not conform to an implementation plan after the plan has been approved or promulgated under Section 110. This means that federally supported or funded activities would not (1) cause or contribute to any new violation of any air quality standard, (2) increase the frequency or severity of any existing violation of any standard, or (3) delay the timely attainment of any standard or any required interim emission reductions or other milestones in any area. In accordance with Section 176(c), USEPA promulgated the General Conformity Rule that is codified as 40 CFR 51, Subpart W. The provisions of this rule apply to state review of all federal general conformity determinations submitted to the state pursuant to 40 CFR 51, Subpart W. The Conformity Rule only affects federal actions occurring in nonattainment and maintenance areas. Since Keesler AFB is located in an attainment area, the Air Force does not plan to prepare a conformity determination for the proposed action at Keesler AFB.

Even though a conformity determination is not required, the federal action must still comply with the conformity requirements of Section 176(c); that is, the federal action may not exceed the threshold and criteria outlined above. For impacts screening in this analysis, a more restrictive criteria than found in the General Conformity Rule was used. Rather than comparing project emissions to 10 percent of a region's inventory (as required by the General Conformity Rule), emissions were compared to 10 percent of Harrison County's year 2002 inventory (National Emissions Inventory) for each pollutant, a more restrictive comparison. Therefore, the 10 percent criterion for each pollutant has been selected to determine if the proposed project causes adverse impacts to air quality.

Air quality effects would occur during construction, demolition, and operations associated with the proposed action and alternative action. Intermittent construction and demolition - related effects would result from fugitive dust (particulate matter) and combustive emissions generated by building construction and demolition and associated construction equipment. Operational effects would occur from stationary sources such as boiler(s) used for heating and from mobile sources such as aircraft.

The methods selected to analyze air quality effects depend on the type of emission source being examined. The primary emission source categories associated with the proposed action and alternative include construction, demolition, operation of the heating system (after facility construction, upon occupation), and aircraft operations. Because construction/demolition phase emissions are generally considered temporary, analysis is limited to estimating the amount of uncontrolled fugitive dust that may be emitted from disturbed areas and the amount of combustive emissions that may be emitted from construction equipment. Analysis of stationary sources (boilers) and mobile sources (aircraft) during the operational phase consist of quantifying the emissions and evaluating how those emissions would affect progress toward maintenance of the national and state ambient air quality standards.

Fundamental steps in the evaluation of environmental effects on air quality are to identify the sources of the effect, identify the quantitative measures for evaluating the extent of the effect, and develop formulas for computing and assessing those measures. These formulations are based on the types of data that are generally available or can easily be collected for the proposed actions. For the proposed action and alternatives, those emission sources anticipated to contribute to ambient air quality effects have been targeted for analysis: construction activity, boiler operation, and aircraft operation.

4.3.10.2 No Action Alternative

Under the no action alternative, there would be no increase in personnel or mission activity at Keesler AFB and there would be no construction or demolition accomplished in support of the CIP, Hurricane Katrina Recovery projects, or the BRAC program as it relates to Keesler AFB. Therefore, the base's operational and indirect emissions would be identical to current baseline emissions presented in Chapter 3.

4.3.10.3 Proposed Action

4.3.10.3.1 Construction Emissions

Fugitive dust from ground disturbing activities and combustive emissions from construction equipment would be generated during the proposed construction under this alternative. For this action, it is conservatively assumed that one-story buildings with 2,228,549 square feet of building space would be constructed; therefore, the buildings would have a total "footprint" of 2,228,549 square feet (51 acres).

Fugitive dust emissions from new construction activities would primarily be generated from site clearing, grading, cut and fill operations, and from vehicular traffic moving over the disturbed sites. Fugitive emissions would be greatest during the initial site preparation activities and would vary from day to day depending on the amount of land being worked, the level of construction activity, the specific operations, and the prevailing meteorological conditions. The USEPA has estimated that uncontrolled fugitive dust emissions from ground disturbing activities are emitted at a rate of 110 lbs of total suspended particulates (TSP) per acre per day of disturbance (USEPA 1995). In an USEPA study of air sampling data taken downwind from construction activities, PM_{10} emissions from various open dust sources were determined based on the ratio of PM_{10} to TSP sampling data. The average PM_{10} to TSP ratios for topsoil removal, aggregate hauling, and cut and fill operations are reported as 0.27, 0.23, and 0.22, respectively (USEPA 1988). Using 0.24 as the average ratio for purposes of analysis, the emission factor for PM_{10} fugitive dust emissions from ground disturbing activities becomes 26.4 lbs per acre per day of disturbance. The USEPA also assumes that 230 working days are available per year for construction (accounting for weekends, weather, and holidays), and that only half of these working days (115 days) would result in uncontrolled fugitive dust emissions at the emitted rate described above. Additionally, four acre-days of disturbance are assumed per acre.

Construction activities would disturb a total 51 acres over a 1-year estimated construction period with an average disturbance of 1.77 acres per day (assumes that disturbance of the area occurs at the same rate throughout this period)[5]. This level of land disturbance would generate approximately 20.33 lbs of PM_{10} per day. Based on the assumption that 115 days per year are used for site preparation, total fugitive PM_{10} emissions from construction activity would be 2.69 tons for the 1-year time period.

PM_{10} emissions are calculated as follows:

Average daily disturbed acreage:

$$\frac{51\, acres\, disturbed}{year} \times \frac{4\, acre - days}{acre} \times \frac{1\, year}{115\, days} = 1.77\, acres$$

[5] A 1-year construction period was used to show that, even if all emissions were assumed to occur in one year, the impact to air quality would still be insignificant.

Average daily PM_{10} emissions:

$$\frac{1.77\ acres}{acre-day}\times\frac{26.4\ pounds\ PM_{10}}{day}=46.73\ pounds\ PM_{10}$$

Total annual PM_{10} emissions:

$$\frac{46.73\ pounds\ PM_{10}}{day}\times\frac{115\ days}{year}\times\frac{ton}{2{,}000\ pounds}=\frac{2.69\ tons}{year}$$

Fugitive dust emissions from demolition/renovation activities would be generated primarily from building dismemberment, debris loading, and debris hauling. The USEPA has established a recommended emission factor of 0.011 pounds of PM_{10} per square foot of demolished/renovated floor area. This emission factor is based on air sampling data taken from the demolition of a mix of commercial brick, concrete, and steel buildings (USEPA 1988). With approximately 2,230,139 square feet of building space scheduled for demolition, estimated fugitive PM_{10} emissions generated from these activities would be 4.22 tons for the 1-year time period.

Under the proposed action, 520,000 square feet (11.9 acres) of roadway would be paved. The USAF Air Conformity Applicability Model (ACAM) provides an emission factor for VOC evaporation from asphalt of 2.62 lbs/acre (USAF 2005c). This equates to 0.02 tons for the 1-year time period.

Types of construction equipment required for a specific task (e.g., construction, demolition, paving, etc.), the hours the equipment is operated, and the operating conditions vary widely from project to project. For purposes of analysis, these parameters were estimated using experience with similar types of construction projects and established cost-estimating methodologies for constructions. Combustive emissions from construction equipment exhausts were estimated from USEPA-approved emissions factors for heavy-duty diesel-powered construction equipment (USEPA 1985). Pollutant emissions are calculated as follows:

$$Construction\ emissions\,(tons)=$$
$$\left(building\ space\,(square\ feet)\times equipment\ usage\left(\frac{hour}{square\ foot\ building\ space}\right)\right)\times$$
$$\left(engine\ emission\ factor\left(\frac{pounds}{hour}\right)\times\frac{ton}{2{,}000\ pounds}\right)$$

Fugitive emissions would produce slightly elevated short-term pollutant concentrations. Table 4-10 summarizes the estimated total fugitive emissions for the proposed action activities.

Table 4-10 Total Construction/Demolition Emissions for Proposed Action (tons/year)

Pollutant Emission Source	CO	NO_x	PM_{10}	SO_x	VOCs
Facility Construction Ground Disturbance			2.69		
Facility Construction Equipment	110.74	247.49	73.83	26.49	18.36
Facility Demolition			12.26		
Facility Demolition Equipment	4.06	51.06	15.77	5.32	20.73
Asphalt Paving Evaporation	1.06	0.17	0.25	0.02	0.06
Asphalt Paving Equipment	2.23	0.35	0.10	0.04	0.11
Total Construction Emissions	**118.09**	**299.07**	**104.90**	**31.87**	**39.26**
Harrison County Emissions	76,846.00	26,298.00	11,762.00	39,471.00	16,509.00
Proposed Action Percent of Harrison County	0.15%	1.143%	0.89%	0.09%	0.24%

CO carbon monoxide
NO_x nitrogen oxide
SO_x sulfur oxide
VOC volatile organic compound
PM_{10} particulate matter with an aerodynamic diameter less than or equal to 10 microns
% percent

4.3.10.3.2 Operational Emissions

As noted above, operational emissions would come from heating requirements (boiler operation) due to any additional building space constructed (as opposed to building space demolished) as part of the proposed action. Based on construction/demolition details presented in Table 2-1, there will be 1,590 square feet more building space demolished than constructed under the proposed action (300,000 square feet for softball fields/RV Park are not considered as building construction). Therefore, no additional boiler capacity is required.

4.3.10.3.3 Indirect Emissions

Implementation of the proposed action would result in a minor change in the number of workers or commuters (due to proposed construction-type projects). Indirect emissions (e.g., emission resulting from the growth inducing impacts) are therefore expected to remain relatively similar to the baseline.

Table 4-10 summarizes total emissions for the proposed action. As can be seen from the information presented in the table, increased emissions are minor when compared to the Harrison County emissions inventory and are well below the 10 percent criteria. It should be noted that a very conservative approach was taken in calculating emissions – all activities were compressed into a 1-year period. Even in this compressed scenario, any effects would be temporary and would fall off rapidly with distance from construction sites. Due to the short-term effect of construction-related fugitive and combustive emission and the small area affected, there would be no potential adverse cumulative decrease in air quality associated with these construction activities.

4.3.10.4 Alternative Action

The primary emission source categories associated with the alternative action include construction, boiler requirements due to any net increase in building space, aircraft operation and associated ground equipment, and vehicle traffic. Because construction phase emissions are generally considered temporary, analysis is limited to estimating the amount of uncontrolled fugitive dust that may be emitted from disturbed areas and the amount of combustive emissions that may be emitted from construction equipment. Analysis of boiler operation and mobile sources (aircraft, aircraft ground equipment [AGE], vehicles) during the operational phase consists of quantifying the emissions and evaluating how those emissions would affect progress toward maintenance of the national and state ambient air quality standards. Under existing conditions, the ambient air quality in Harrison County is classified as attainment for all criteria pollutants.

4.3.10.4.1 Construction Emissions

Fugitive dust from ground disturbing activities and combustive emissions from construction equipment would be generated during the proposed construction under the alternative action. For this action, it is conservatively assumed that one-story buildings with 1,522,508 square feet of building space would be constructed; therefore, the buildings would have a total "footprint" of 1,522,508 square feet (35 acres).

Fugitive dust emissions from new construction activities would primarily be generated from site clearing, grading, cut and fill operations, and from vehicular traffic moving over the disturbed sites. Fugitive emissions would be greatest during the initial site preparation activities and would vary from day to day depending on the amount of land being worked, the level of construction activity, the specific operations, and the prevailing meteorological conditions. The USEPA has estimated that uncontrolled fugitive dust emissions from ground disturbing activities are emitted at a rate of 110 lbs of TSP per acre per day of disturbance (USEPA 1995). In an USEPA study of air sampling data taken downwind from construction activities, PM_{10} emissions from various open dust sources were determined based on the ratio of PM_{10} to TSP sampling data. The average PM_{10} to TSP ratios for topsoil removal, aggregate hauling, and cut and fill operations are reported as 0.27, 0.23, and 0.22, respectively (USEPA 1988). Using 0.24 as the average ratio for purposes of analysis, the emission factor for PM_{10} fugitive dust emissions from ground disturbing activities becomes 26.4 pounds per acre per day of disturbance. The USEPA also assumes that 230 working days are available per year for construction (accounting for weekends, weather, and holidays), and that only half of these working days (115 days) would result in uncontrolled fugitive dust emissions at the emitted rate described above. Additionally, four acre-days of disturbance are assumed per acre.

Construction activities would disturb a total 35 acres over a 1-year estimated construction period with an average disturbance of 1.22 acres per day (assumes that disturbance of the area occurs at the same rate throughout this period). This level of land disturbance would generate approximately 20.33 pounds of PM_{10} per day. Based on the assumption that 115 days per year are used for site preparation, total fugitive PM_{10} emissions from construction activity would be 1.17 tons for the 1-year time period.

PM_{10} emissions are calculated as follows:

Average daily disturbed acreage:

$$\frac{35\ acres\ disturbed}{year} \times \frac{4\ acre-days}{acre} \times \frac{1\ year}{115\ days} = 1.22\ acres$$

Average daily PM_{10} emissions:

$$\frac{1.22\ acres}{acre-day} \times \frac{26.4\ pounds\ PM_{10}}{day} = 32.21\ pounds\ PM_{10}$$

Total annual PM_{10} emissions:

$$\frac{32.21\ pounds\ PM_{10}}{day} \times \frac{115\ days}{year} \times \frac{ton}{2{,}000\ pounds} = \frac{1.85\ tons}{year}$$

Fugitive dust emissions from demolition/renovation activities would be generated primarily from building dismemberment, debris loading, and debris hauling. The USEPA has established a recommended emission factor of 0.011 pounds of PM_{10} per square foot of demolished/renovated floor area. This emission factor is based on air sampling data taken from the demolition of a mix of commercial brick, concrete, and steel buildings (USEPA 1988). With approximately 288,239 square feet of building space scheduled for demolition, estimated fugitive PM_{10} emissions generated from these activities would be 1.59 tons for the 1-year time period.

Under the alternative action, 1,807,747 square feet (41.5 acres) of roadway would be paved (53.4 acres scheduled for paving, minus the 11.9 acres paved under the proposed action). The USAF ACAM provides an emission factor for VOC evaporation from asphalt of 2.62 lbs/acre. This equates to 0.05 tons for the 1-year time period.

Types of construction equipment required for a specific task (construction, demolition, paving, etc.), the hours the equipment is operated, and the operating conditions vary widely from project to project. For purposes of analysis, these parameters were estimated using experience with similar types of construction projects and established cost-estimating methodologies for constructions. Combustive emissions from construction equipment exhausts were estimated from USEPA approved emissions factors for heavy-duty diesel-powered construction equipment (USEPA 1985).

Fugitive emissions would produce slightly elevated short-term pollutant concentrations. Table 4-11 summarizes the estimated total emissions for the alternative action activities. As can be seen from the information presented in the table, increased emissions are minor when compared to the Harrison County emissions inventory and are well below the 10 percent criteria. It should be noted that a very conservative approach was taken in calculating emissions – all activities were compressed into a 1-year period. Any effects would be temporary and would fall off rapidly with distance from construction sites. Due to the short-term effect of construction-related fugitive and combustive emission and the small area affected, there would be no potential adverse cumulative decrease in air quality associated with these construction activities.

4.3.10.4.2 Operational Emissions

As noted previously, operational emissions would come from heating requirements (boiler operation) due to any additional building space constructed (as opposed to building space demolished) and mobile sources (aircraft, AGE vehicles) as part of the alternative action. Based on construction/demolition details presented in Table 2-1, there will be an additional 1,522,508 square feet of building space under the alternative action. ACAM was used to calculate emissions from boiler operations required to heat the additional building space. Emissions are provided in Table 4-11.

Calculations of pollutant emissions from aircraft operations were based on the annual number of landing-takeoff (LTO) and touch-and-go (TGO) cycles and the number of patterns flown in conjunction with landings at Keesler AFB. The rates of emissions from aircraft engines vary according to these types of aircraft operations. An LTO cycle includes an approach from 3,000 feet above ground level to the airfield, landing, taxi-in to a parking position, taxi-out to the runway, take-off, and climb-out to 3,000 AGL. A TGO cycle is identical to a LTO cycle except that all taxi time has been excluded (no TGOs were assumed to occur in this evaluation). Only those portions of the flying operation that take place below the atmospheric mixing height are considered (these are the only emission presumed to affect ground level concentrations). The 3,000 feet AGL ceiling was assumed as the atmospheric mixing height above which any pollutant generated would not contribute to increased pollutant concentrations at ground level. Therefore, all pollutant emissions from aircraft generated above 3,000 feet AGL were excluded from the analysis.

Table 4-11 Total Construction/Demolition Emissions for Alternative Action (tons/year)

Pollutant Emission Source	CO	NO_x	PM_{10}	SO_x	VOCs
Facility Construction Ground Disturbance			1.85		
Facility Construction Equipment	65.69	149.53	9.80	15.98	10.96
Facility Demolition			1.59		
Facility Demolition Equipment	0.52	6.60	2.04	0.69	2.68
Asphalt Paving VOC Evaporation	0.00	0.00	0.00	0.00	0.03
Asphalt Paving Equipment	6.27	0.99	0.27	0.12	0.32
Total Proposed Action Construction Emissions	118.09	299.07	104.90	31.87	39.26
Total Alternative Action Construction/Demolition Emissions	**190.57**	**456.19**	**120.45**	**48.66**	**53.25**
Construction/Demolition: Percent of Harrison County Emission Inventory	0.25%	1.73%	1.02%	0.12%	0.32%
Heating	4.33	5.30	0.38	0.03	0.27
Vehicles	1,580.71	85.79	1.99	1.41	126.90
Aircraft Flight Operations	32.00	40.00	4.00	3.00	7.00
Total Alternative Action Operational Emissions	**1,617.04**	**131.09**	**6.37**	**4.44**	**134.17**
Operational: Percent of Harrison County Emission Inventory	2.10%	0.50%	0.05%	0.01%	0.81%
Construction/Demolition + Operational Percent of Harrison County Emission Inventory	2.35%	2.23%	1.07%	0.13%	1.13%
Harrison County Emissions	76,846.00	26,298.00	11,762.00	39,471.00	16,509.00

CO carbon monoxide; NO_x nitrogen oxide; % percent
SO_x sulfur oxide; VOC volatile organic compound
PM_{10} particulate matter with an aerodynamic diameter less than or equal to 10 microns

Keesler AFB currently supports approximately 36,400 aircraft operations annually, or 146 daily operations. To assess the potential for the expansion of C-130J flight operations at Keesler AFB, C-130J flights were incrementally increased and evaluated. The resulting noise analysis identified a potential for a total of 42,000 annual or 168 daily operations at the installation. This represents a 15 percent increase in total current aircraft operations and a 60 percent increase in current C-130J flight operations – 5,600 operations per year. Since the C-130J was not in the ACAM inventory, the C-130F (T56-A-7 engine) was used since it presented the most conservative emission factors. The ACAM model was used to calculate emissions from C-130J flight operations. For the various flight profiles, Air Force-published fuel flow rates, emission factors, and times-in-mode were used by the model for estimating pollutant emissions. ACAM also calculated emissions from engine testing, auxiliary power unit operation, and associated aerospace ground equipment. Aircraft-related emissions are presented in Table 4-11.

4.3.10.4.3 Indirect Emissions

Based on an analysis of potential new facilities (including administrative, training, and housing structures) it has been determined that the base has the potential to accommodate an additional 5,360 working personnel (military and civilian), 4,522 students, 1,178 resident dependents, and 656 visitors resulting in an additional base population of 11,716 people (Appendix B). ACAM was used to calculate the emissions from mobile sources (privately owned vehicles and government owned vehicles) attributed to the influx of the additional 11,716 personnel. For calculation purposes, it was assumed that 1) 50 percent of the additional personnel would live on base, 2) a one-way commute would be 20 miles, and 3) government vehicles would be driven 500 miles per year. Mobile source emissions are presented in Table 4-11.

Table 4-11 summarizes total emission for the alternative action. As can be seen from the information presented in the table, increased emissions are minor when compared to the Harrison County emissions inventory and are well below the 10 percent criteria. It should be noted that a very conservative approach was taken in calculating emissions – all activities were compressed into a 1-year period.

4.3.10.5 Cumulative Impacts

The alterative action would contribute air pollution emissions during construction and demolition, and during the operational phase that occurs in the out years after base construction/demolition activities are completed. The contribution from the different phases of the action would impact regional air quality goals and attainment standards, but the contribution from the project would be negligible. Even when both construction/demolition and operational emission are added together, the total only represents a small percentage of Harrison County's annual emissions. Project emissions would not contribute to other county emissions in any appreciable manner.

4.3.10.6 Measures to Reduce Impacts

It should be noted that the fugitive dust emissions were calculated assuming no dust control methods were utilized; however, fugitive dust emissions would be reduced with implementation of good management practices and use of control measures. The USEPA estimates that the effects of fugitive dust from construction activities would be reduced significantly with an effective watering program. In addition, the state requires that no person shall permit or allow the emissions of unconfined particulate matter from any activity, including vehicular movement; transportation of materials; construction, alteration, demolition, or wrecking without taking reasonable precautions to prevent such emissions. BMPs would be employed to control fugitive dust from any construction activity and help prevent any dust related problems that may occur in the vicinity of construction projects. These management practices may include the following controls:

- Application of water or chemical dust suppressants to control fugitive particulate emissions from such activities as demolition of buildings, grading roads, construction, and land clearing.
- Application of asphalt, water, oil, chemicals or other dust suppressants to unpaved roads, yards, open stockpiles, and similar sources.
- Removal of particulate matter from roads and other paved areas to prevent reentrainment, and from buildings or work areas to prevent particulate matter from becoming airborne.
- Sweeping vehicle/aircraft traffic areas where dust may accumulate either from carryover by construction equipment or from airborne settling.
- Reducing construction vehicle speed.
- Landscaping or planting of vegetation as soon as practical.

Combustive emissions from construction vehicles/equipment could be mitigated by efficient scheduling or equipment use, implementing a phased construction schedule to reduce the number of units operating simultaneously, and performing regular vehicle engine maintenance. The amount of emission reduction provided by these measures is not known with certainty because of the potential variables involved; however, it is assumed that implementation of these measures would substantially reduce combustive emissions and air quality effects from construction activities.

4.3.11 Cultural Resources

Potential impacts of the proposed action were assessed by (1) identifying the nature and potential significance of cultural resources in potentially affected areas and (2) identifying activities that could directly affect cultural resources classified as historic properties. Historic properties, as defined by 36 CFR 800 are cultural resources included in, or eligible for inclusion in the NRHP. The term “eligible for inclusion” includes both listed and eligible properties that meet NRHP listing criteria as outlined by 36 CFR 60.4.

Therefore, cultural resources not yet evaluated are considered potentially eligible for the NRHP and are afforded the same regulatory consideration as nominated historic properties. Under Section 106 of the NHPA, when a federal action meets the definition of an undertaking, the federal agency must consult with the SHPO and other identified consulting parties. The federal agency is responsible for determining whether any historic properties are located in the area, assessing whether the proposed undertaking would adversely impact the resources, and notifying the SHPO of any adverse impacts.

Direct adverse impacts to archaeological sites eligible for listing on the National Register may result from construction or demolition activities including clearing, grading, paving, utility installation, and earth moving. Indirect effects can occur from increased use of areas near or adjacent to archaeological sites resulting in vandalism, erosion, and other adverse effects.

4.3.11.1 No Action Alternative

Under the no action alternative, there would be no change from the baseline condition. Therefore, no archaeological or historic resources would be affected by the no action alternative.

4.3.11.2 Proposed Action

Based on the locations of cultural resources on Keesler AFB, as summarized in the current CRMP, the proposed action would have no adverse impacts on archeological resources (USAF 2003a).

The proposed action includes the demolition of Hanger 0228. As discussed in Section 3.3.11.2, Keesler AFB determined that demolition of Hanger 0228 was needed and consulted with the Mississippi SHPO and the ACHP requesting acceptance of the demolition of Hanger 0228 (USAF 2003b). A Memorandum of Agreement was reached between the 81 TRW, the MDAH, and the ACHP allowing for the demolition of Hanger 0228 (ACHP 2006). The Memorandum of Agreement recommended that appropriate Historic American Building Survey documentation be provided as appropriate mitigation in the event that it is deemed necessary to demolish Hanger 0228. The 81 TRW must also exhaust all efforts to utilize architectural elements that can be feasibly salvaged from Hanger 0228 during demolition, permanently maintain reproducible copies of the original building drawings and photograph negatives, and provide the documentation and photographic record to the Keesler AFB Historical Preservation Office to facilitate local accessibility and archival storage of documentation of this structure (ACHP 2006).

An interagency coordination letter was sent to the MDAH (see Appendix A) SHPO to inform them of the proposed action and to solicit their input regarding historical and archaeological resources. The MDAH SHPO determined that no properties listed in or eligible for listing in the NRHP would be affected under the proposed action (Woodrick 2006). This determination is contingent upon compliance with the Memorandum of Agreement referenced above.

4.3.11.3 Alternative Action

Impacts for the alternative action are the same as those for the proposed action since no additional potential historic resources would be affected.

4.3.11.4 Cumulative Impacts

When considered with respect to other ongoing actions, neither the proposed nor the alternative actions are expected to have cumulative impacts on cultural resources in or around Keesler AFB.

4.3.11.5 Measures to Reduce Impacts

As part of the Memorandum of Agreement, it was recommended that appropriate Historic American Building Survey documentation be provided as appropriate mitigation in the event that it was deemed necessary to demolish Hanger 0228. The 81 TRW must exhaust all efforts to utilize architectural elements that could feasibly be salvaged from Hanger 0228 during demolition, permanently maintain reproducible copies of the original building drawings and photograph negatives, and provide documentation and photographic record to the Keesler AFB Historical Preservation Office to facilitate local accessibility and archival storage of documentation of this structure (ACHP 2006).

If any archeological artifacts were to be exposed during construction and demolition activities, construction or demolition activities would cease, as required by federal and USAF regulations. The 81 CES/CEV would be contacted and would inform appropriate federal, state, and local government officials and other public groups. Work would not resume until an archeological investigation is completed. In addition, the SHPO would be notified within 48-hour of any archeological artifact discovery.

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Chapter 5

List of Preparers

CHAPTER 5

LIST OF PREPARERS

Name/ Organization	Degree	Professional Discipline	Years of Experience
Kent R. Wells, P.G. Science Applications International Corporation (SAIC)	B.S., Geology M.S., Industrial Hygiene	Environmental Scientist	20
Benjamin P. Elliott, P.E. SAIC	B.A., Physical Sciences, B.S., Civil Engineering, M.S.E., Petroleum and Geosystems Engineering,	Civil Engineer	10
James A. Garrison, P.E., SAIC	M.E., Environmental Engineering, B.S. Agricultural Engineering	Environmental Engineer	30
Joshua B. Heiss, SAIC	B.S., Natural Resources and Environmental Science	Environmental Scientist	8
Irene M. Johnson, SAIC	B.S., Economics M.A., Economics	Economist	17
Brandi J. Mulkey, E.I.T. SAIC	B.S., Environmental Engineering	Environmental Engineer	7
Victoria J. Wark SAIC	B.S., Biology	Biologist	18
William A. Wuest SAIC	M.P.A., Political Science B.S., Political Science	Noise Specialist	33

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Chapter 6

Persons and Agencies Consulted

CHAPTER 6

PERSONS AND AGENCIES CONSULTED

The following individuals were consulted during the preparation of this EA:

6.1 FEDERAL AGENCIES

Keesler Air Force Base

Brock, Dick (81 TRW/JA)
Cook, Don (81 MSG/SV)
Daniel, George (81 CES/CEVN)
Diaz, Carlos SSgt (81 TRW/PA)
Dunn, Hermis (403 WG)
Eldredge, Louis Capt (81 TRW/JA)
Hunt, David Maj (81 ADMS/SGPB)
James, Ted (81 CES/CEVN)
Kinman, Don (81 CES/CECB)
Richards, Eddie Lt Col (81 CES/PMO)

Headquarters Air Education and Training Command

Voorhees, Ron (HQ AETC/A7CVI)

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Holmes, H.T. (Mississippi Department of Archives and History)
Boyd, Jan (Mississippi Department of Marine Resources)
Bhowal, Pradip (Mississippi Department of Environmental Quality

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Chapter 7

References

CHAPTER 7

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Appendix A

Interagency and Intergovernmental Coordination for Environmental Planning

APPENDIX A

INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING

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DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

James J. Chiniche, P.E., REM
Chief, Environmental Flight
81st Civil Engineer Squadron
508 L Street
Keesler AFB MS 39534-2115

June 14, 2006

Ms Janet Riddell
Dept of Finance and Administration
Office of Federal Grants (Clearing House)
1301 Wool Folk Blvd, Suite E 501 NW Street
Jackson MS 39201

Dear Ms Riddell

The 81st Training Wing (TRW) at Keesler Air Force Base (AFB), Mississippi, is preparing an Environmental Assessment (EA) for Hurricane Katrina recovery and other redevelopment efforts in support of the Capital Improvements Program (CIP). The environmental analysis is being conducted in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we solicit your comments concerning the proposed action and alternatives.

The proposed action includes new building construction and alteration, replacement of old buildings, and demolition of some facilities. Under this proposed action, there would be construction of over 1.5 million square feet of facilities and 350 thousand square feet of pavements and demolition of 840 thousand square feet of facilities.

An alternative to the proposed action is to maximize development potential at Keesler AFB. Under this alternative, Keesler AFB would develop 131 acres comprised of 26 parcels, build nearly 1.9 million square feet of facilities, increase airfield operations of based aircraft by 60 percent, and substantially increase on-base population.

Under the no action alternative, there would be no construction or demolition accomplished in support of the Hurricane Katrina recovery efforts or CIP at Keesler AFB. This course of action would limit the Wing's ability to successfully conduct its mission and maintain wartime readiness and training.

We solicit your comments or concerns regarding the proposal so that we might address them in our analysis. When completed, the Draft EA will be forwarded for your review. A listing of Federal and state agencies that have been contacted is attached. If there are any additional agencies you feel should review the proposal or the Draft EA, please let us know. To facilitate

cumulative impact analysis, we would also appreciate identification of major projects in the vicinity that may contribute to cumulative impacts associated with this proposal.

Any questions concerning the proposal may be directed to Mr. Kent Wells at Science Applications International Corporation, at (210) 731-2217. Please forward written comments to Mr. George Daniel, 81st Civil Engineer Squadron, 508 L Street, Keesler AFB, Mississippi 39534-2115. Thank you for your assistance.

Sincerely

JAMES J. CHINICHE, P.E., REM
Chief, Environmental Flight

Attachment
Listing of Federal and State Agencies

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Mississippi Department of Environmental Quality
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Jackson MS 39289

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Mississippi Department of Archives and History
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Mr. Ray Aycock
Field Supervisor
U. S. Fish and Wildlife Service
6578 Dogwood View Pkwy, Suite A
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Mr. Jerry Brashier
Mississippi Department of Marine Resources
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Department of the Army
Mobile District, corps of Engineers
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James J. Chiniche, P.E., REM
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81st Civil Engineer Squadron
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June 14, 2006

Mr. Ray Aycock
Field Supervisor
U. S. Fish and Wildlife Service
6578 Dogwood View Pkwy, Suite A
Jackson MS 39213

Dear Mr. Aycock

The 81st Training Wing (TRW) at Keesler Air Force Base (AFB), Mississippi, is preparing an Environmental Assessment (EA) for Hurricane Katrina recovery and other redevelopment efforts in support of the Capital Improvements Program (CIP). The environmental analysis is being conducted in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we solicit your comments concerning the proposed action and alternatives.

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Sincerely

JAMES J. CHINICHE, P.E., REM
Chief, Environmental Flight

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DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

James J. Chiniche, P.E., REM
Chief, Environmental Flight
81st Civil Engineer Squadron
508 L Street
Keesler AFB MS 39534-2115

June 14, 2006

Ms Susan Rees
Department of the Army
Mobile District, Corps of Engineers
P O Box 2288
Mobile AL 36628-1613

Dear Ms Rees

The 81st Training Wing (TRW) at Keesler Air Force Base (AFB), Mississippi, is preparing an Environmental Assessment (EA) for Hurricane Katrina recovery and other redevelopment efforts in support of the Capital Improvements Program (CIP). The environmental analysis is being conducted in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we solicit your comments concerning the proposed action and alternatives.

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Sincerely

JAMES J. CHINICHE, P.E., REM
Chief, Environmental Flight

Attachment
Listing of Federal and State Agencies

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

James J. Chiniche, P.E., REM
Chief, Environmental Flight
81st Civil Engineer Squadron
508 L Street
Keesler AFB MS 39534-2115

June 14, 2006

Mr. Jerry Brashier
Mississippi Department of Marine Resources
1141 Bay View Ave, Suite 101
Biloxi MS 39530-1613

Dear Mr. Brashier

The 81st Training Wing (TRW) at Keesler Air Force Base (AFB), Mississippi, is preparing an Environmental Assessment (EA) for Hurricane Katrina recovery and other redevelopment efforts in support of the Capital Improvements Program (CIP). The environmental analysis is being conducted in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we solicit your comments concerning the proposed action and alternatives.

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Chief, Environmental Flight

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DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

James J. Chiniche, P.E., REM
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81st Civil Engineer Squadron
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June 14, 2006

Mr. Thomas H. Waggener, SHPO
Mississippi Department of Archives and History
P O Box 571
Jackson MS 39205

Dear Mr. Waggener

The 81st Training Wing (TRW) at Keesler Air Force Base (AFB), Mississippi, is preparing an Environmental Assessment (EA) for Hurricane Katrina recovery and other redevelopment efforts in support of the Capital Improvements Program (CIP). The environmental analysis is being conducted in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we solicit your comments concerning the proposed action and alternatives.

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DEPARTMENT OF THE AIR FORCE
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James J. Chiniche, P.E., REM
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June 14, 2006

Mr. Phil Bass
Mississippi Department of Environmental Quality
P O Box 20305
Jackson MS 39289

Dear Mr. Bass

The 81st Training Wing (TRW) at Keesler Air Force Base (AFB), Mississippi, is preparing an Environmental Assessment (EA) for Hurricane Katrina recovery and other redevelopment efforts in support of the Capital Improvements Program (CIP). The environmental analysis is being conducted in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we solicit your comments concerning the proposed action and alternatives.

The proposed action includes new building construction and alteration, replacement of old buildings, and demolition of some facilities. Under this proposed action, there would be construction of over 1.5 million square feet of facilities and 350 thousand square feet of pavements and demolition of 840 thousand square feet of facilities.

An alternative to the proposed action is to maximize development potential at Keesler AFB. Under this alternative, Keesler AFB would develop 131 acres comprised of 26 parcels, build nearly 1.9 million square feet of facilities, increase airfield operations of based aircraft by 60 percent, and substantially increase on-base population.

Under the no action alternative, there would be no construction or demolition accomplished in support of the Hurricane Katrina recovery efforts or CIP at Keesler AFB. This course of action would limit the Wing's ability to successfully conduct its mission and maintain wartime readiness and training.

We solicit your comments or concerns regarding the proposal so that we might address them in our analysis. When completed, the Draft EA will be forwarded for your review. A listing of Federal and state agencies that have been contacted is attached. If there are any additional agencies you feel should review the proposal or the Draft EA, please let us know. To facilitate cumulative impact analysis, we would also appreciate identification of major projects in the vicinity that may contribute to cumulative impacts associated with this proposal.

cumulative impact analysis, we would also appreciate identification of major projects in the vicinity that may contribute to cumulative impacts associated with this proposal.

Any questions concerning the proposal may be directed to Mr. Kent Wells at Science Applications International Corporation, at (210) 731-2217. Please forward written comments to Mr. George Daniel, 81st Civil Engineer Squadron, 508 L Street, Keesler AFB, Mississippi 39534-2115. Thank you for your assistance.

Sincerely

JAMES J. CHINICHE, P.E., REM
Chief, Environmental Flight

Attachment
Listing of Federal and State Agencies

MISSISSIPPI
DEPARTMENT OF MARINE RESOURCES

August 2, 2006

Mr. George Daniel
81st Civil Engineer Squadron
508 L Street
Keesler AFB, MS 39534-2115

RE: DMR-070044

Dear Mr. Daniel:

The Department of Marine Resources in cooperation with other state agencies is responsible under the Mississippi Coastal Program (MCP) for managing the coastal resources of Mississippi. Proposed activities in the coastal area are reviewed to insure that the activities are in compliance with the MCP.

The Department has received your request to review proposed new building construction and alteration, replacement of old buildings, and demolition of some facilities at Keesler AFB in Harrison County, Mississippi. The Department has no objections provided there are no direct or indirect impacts to coastal wetlands and no coastal program agency objects to the proposal. If coastal wetland impacts are anticipated, an application should be submitted to this office for review. Thank you for the opportunity to comment on your project.

For more information or questions concerning this correspondence, contact Jennifer Clark with the Bureau of Wetlands Permitting at (228) 523-4111 or jennifer.clark@dmr.state.ms.us.

Sincerely,

Jan Boyd
Office Director, Coastal Ecology

JB/jlc

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

JUL 9 2003

Lt Col David L. Yang
Commander, 81st Civil Engineer Squadron
508 L Street
Keesler AFB MS 39534

Mr. Thomas H. Waggener
Mississippi Department of Archives and History
Post Office Box 571
Jackson MS 39205

Dear Mr. Waggener

Keesler AFB, Biloxi, Mississippi, is planning a project that may adversely affect a property that is potentially eligible for the National Register of Historic Places. Pursuant to Section 106 of the National Historic Preservation Act, we are initiating initial consultation with your office to provide necessary action regarding cultural resources procedures and documentation and timely execution of the Air Force project.

The Air Force is currently developing a project to demolish building number 0228, known as the "Old Biloxi Hangar," in order to make critical flightline space available for new missions such as the C-130J. We are extremely cramped in this area and desperately need key property adjacent to our aircraft parking and maintenance ramps for modern facilities. Initial studies indicate building number 0228 cannot be modified or adapted for these missions and would be uneconomical to repair or renovate. Since demolition of a historic property is an adverse effect, we are interested in discussion of mitigation options to include a Historic American Building Survey inventory.

Please direct questions to Mr. George Daniel at (228) 377-5823.

Sincerely

DAVID L. YANG, Lt Col, USAF

cc:
Mr. Raymond Wallace
Advisory Council on Historic Preservation
Old Post Office Building, Room 809
1100 Pennsylvania Ave, NW
Washington DC 20004-2604

Mississippi Department of Archives and History

Historic Preservation Division
PO Box 571 • Jackson, MS 39205-0571 • 601 / 359-6940 • Fax 601 / 359-6955 • mdah.state.ms.us

Established 1902

August 11, 2003

Lt. Col. David L. Yang
Commander, 81st Civil Engineer Squadron
508 L Street
Keesler AFB MS 39534

Dear Col. Yang:

RE: Proposal to demolish the "Old Biloxi Hangar (Building 0228)

We have reviewed your letter concerning the proposed demolishing of the "Old Biloxi Hangar" pursuant to our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. As you know, this structure is the only property on Keesler Air Force Base eligible for listing in the National Register of Historic Places. It is the only surviving structure on the base that predates the establishment of the base. Additionally, it represents the historic relationship between Keesler Air Force Base and the City of Biloxi.

As you stated in your letter, the demolition of the Hangar would obviously result in an adverse effect on a National Register eligible property. It seems reasonable to us that documentation should be provided concerning the scope and nature of the proposed undertaking, examination of alternatives to demolition, and suitable site plans to demonstrate the contention of the Air Force that there is no alternative to demolition of the Hangar. It seems to us that it is premature to discuss mitigation options prior to establishing the necessity of the action. Secondly, the Advisory Council on Historic Preservation should be formally advised that consideration is being given to an undertaking which will result in the demolition of a building eligible for listing in the National Register of Historic Places and afforded an opportunity to enter the discussion in due course.

Upon receipt of the requested information, we will be in a better position to provide comments. If you have questions or need additional information, please let us know.

Sincerely,

Thomas H. Waggener

Thomas H. Waggener
Review and Compliance Officer

c: Mr. Raymond Wallace
Advisory Council on Historic Preservation

Mr. George Daniel

JAN 0 4 2005

Lt Colonel David L. Yang, Commander
81st Civil Engineer Squadron
508 L Street
Keesler AFB MS 39534-2115

Mr. Thomas Waggener
Mississippi Department of Archives and History
Post Office Box 571
Jackson MS 39205-0571

Dear Mr. Waggener

In response to your 11 August 2003 letter regarding our proposal to demolish Building 0228, "Old Biloxi Hangar", we offer the following information. The Air Force is currently developing a project to accomplish this demolition to make critical flight line space available for an Aerial Port Training Facility required to support C-130J aircraft stationed at this installation.

Attachment one provides a plan of the existing Airfield Operations (AO) area at this installation. This drawing indicates the existing AO is extremely cramped and only two small areas exist for expansion.

Attachment two is the approved Flight Line portion of our overall General Plan for development. The proposed Aerial Port Training Facility and Consolidated Mobility Center are planned for the Old Biloxi Hangar site while the new 403d Flying Wing Headquarters facility is scheduled to be built adjacent to the airfield area at the second site. Both these facilities are required to be adjacent to the aircraft movement area. Prior to the development of the General Plan, all alternatives were reviewed and there are no other unused airfield sites for these functions.

Please contact Mr. George Daniel at (228) 377-5823 if you have any questions.

Sincerely

SIGNED

DAVID L. YANG, Lt Colonel, USAF
Commander

2 Attachments:
1. Existing Airfield Operations drawing
2. Flight Line portion of General Plan
3. MS Dept of Archives and History Letter, 11 Aug 03

CEV CD

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

19 October 2006

James J. Chiniche, P.E., REM
Chief, Environmental Flight
81st Civil Engineering Squadron
508 L Street
Keesler AFB, MS 39534-2115

USFWS Region 4
Keith Taniguchi, Chief
Division of Habitat Conservation
1875 Century Blvd., Suite 200
Atlanta, GA 30345

Dear Mr. Taniguchi:

The United States Air Force is preparing an environmental assessment for Hurricane Katrina Recovery and Installation Development on Keesler AFB. The attachment to this letter describes the proposal and the alternatives being analyzed in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we request your comments concerning the proposal and any potential environmental consequences. To facilitate cumulative impact analysis, we would also appreciate identification of major projects in the vicinity that may contribute to cumulative effects.

Please return all comments within 30 days from the date of this memorandum. Any questions concerning the proposal should be directed to Mr. George Daniel, 81 CES/CEVN, at the address indicated above or by telephone at (228) 377-5823. Thank you for your assistance.

Sincerely,

James J. Chiniche, P.E., REM
Chief, Environmental Flight

Attachment
1. Environmental Assessment/Finding of No Significant Impact/
   Finding of No Practicable Alternative

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

19 October 2006

James J. Chiniche, P.E., REM
Chief, Environmental Flight
81st Civil Engineering Squadron
508 L Street
Keesler AFB, MS 39534-2115

Mr. Elbert Hilliard, SHPO
Mississippi Department of Archives and History
PO Box 571
Jackson, MS 39205

Dear Mr. Hilliard:

The United States Air Force is preparing an environmental assessment for Hurricane Katrina Recovery and Installation Development on Keesler AFB. The attachment to this letter describes the proposal and the alternatives being analyzed in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we request your comments concerning the proposal and any potential environmental consequences. To facilitate cumulative impact analysis, we would also appreciate identification of major projects in the vicinity that may contribute to cumulative effects.

Please return all comments within 30 days from the date of this memorandum. Any questions concerning the proposal should be directed to Mr. George Daniel, 81 CES/CEVN, at the address indicated above or by telephone at (228) 377-5823. Thank you for your assistance.

Sincerely,

James J. Chiniche, P.E., REM
Chief, Environmental Flight

Attachment
1. Environmental Assessment/Finding of No Significant Impact/
   Finding of No Practicable Alternative

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

James J. Chiniche, P.E., REM
Chief, Environmental Flight
81st Civil Engineering Squadron
508 L Street
Keesler AFB, MS 39534-2115

19 October 2006

USFWS Jackson Field Office
Mr. Ray Aycock, Field Supervisor
6578 Dogwood View Parkway, Suite A
Jackson, MS 39213

Dear Mr. Aycock:

The United States Air Force is preparing an environmental assessment for Hurricane Katrina Recovery and Installation Development on Keesler AFB. The attachment to this letter describes the proposal and the alternatives being analyzed in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we request your comments concerning the proposal and any potential environmental consequences. To facilitate cumulative impact analysis, we would also appreciate identification of major projects in the vicinity that may contribute to cumulative effects.

Please return all comments within 30 days from the date of this memorandum. Any questions concerning the proposal should be directed to Mr. George Daniel, 81 CES/CEVN, at the address indicated above or by telephone at (228) 377-5823. Thank you for your assistance.

Sincerely,

James J. Chiniche, P.E., REM
Chief, Environmental Flight

Attachment
1. Environmental Assessment/Finding of No Significant Impact/
   Finding of No Practicable Alternative

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

19 October 2006

James J. Chiniche, P.E., REM
Chief, Environmental Flight
81st Civil Engineering Squadron
508 L Street
Keesler AFB, MS 39534-2115

Department of the Army
Mobile District, Corps of Engineers
P.O. Box 2288
Mobile, Alabama 36628-0001

Dear Agency Representative:

The United States Air Force is preparing an environmental assessment for Hurricane Katrina Recovery and Installation Development on Keesler AFB. The attachment to this letter describes the proposal and the alternatives being analyzed in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we request your comments concerning the proposal and any potential environmental consequences. To facilitate cumulative impact analysis, we would also appreciate identification of major projects in the vicinity that may contribute to cumulative effects.

Please return all comments within 30 days from the date of this memorandum. Any questions concerning the proposal should be directed to Mr. George Daniel, 81 CES/CEVN, at the address indicated above or by telephone at (228) 377-5823. Thank you for your assistance.

Sincerely,

James J. Chiniche, P.E., REM
Chief, Environmental Flight

Attachment
1. Environmental Assessment/Finding of No Significant Impact/
   Finding of No Practicable Alternative

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

James J. Chiniche, P.E., REM
Chief, Environmental Flight
81st Civil Engineering Squadron
508 L Street
Keesler AFB, MS 39534-2115

19 October 2006

Mississippi Department of Marine Resources
1141 Bayview Avenue, Suite 101
Biloxi, MS 39530-1613

Dear Agency Representative:

The United States Air Force is preparing an environmental assessment for Hurricane Katrina Recovery and Installation Development on Keesler AFB. The attachment to this letter describes the proposal and the alternatives being analyzed in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we request your comments concerning the proposal and any potential environmental consequences. To facilitate cumulative impact analysis, we would also appreciate identification of major projects in the vicinity that may contribute to cumulative effects.

Please return all comments within 30 days from the date of this memorandum. Any questions concerning the proposal should be directed to Mr. George Daniel, 81 CES/CEVN, at the address indicated above or by telephone at (228) 377-5823. Thank you for your assistance.

Sincerely,

James J. Chiniche, P.E., REM
Chief, Environmental Flight

Attachment
1. Environmental Assessment/Finding of No Significant Impact/
   Finding of No Practicable Alternative

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

19 October 2006

James J. Chiniche, P.E., REM
Chief, Environmental Flight
81st Civil Engineering Squadron
508 L Street
Keesler AFB, MS 39534-2115

Mr. Charles Chisolm
Executive Director
Mississippi Department of Environmental Quality
PO Box 20305
Jackson, MS 39289

Dear Mr. Chisolm:

The United States Air Force is preparing an environmental assessment for Hurricane Katrina Recovery and Installation Development on Keesler AFB. The attachment to this letter describes the proposal and the alternatives being analyzed in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we request your comments concerning the proposal and any potential environmental consequences. To facilitate cumulative impact analysis, we would also appreciate identification of major projects in the vicinity that may contribute to cumulative effects.

Please return all comments within 30 days from the date of this memorandum. Any questions concerning the proposal should be directed to Mr. George Daniel, 81 CES/CEVN, at the address indicated above or by telephone at (228) 377-5823. Thank you for your assistance.

Sincerely,

James J. Chiniche, P.E., REM
Chief, Environmental Flight

Attachment
1. Environmental Assessment/Finding of No Significant Impact/
Finding of No Practicable Alternative

COPY

MISSISSIPPI Department of
MDAH
ARCHIVES & HISTORY

HISTORIC PRESERVATION
PO Box 571, Jackson, MS 39205-0571
601-576-6940 • Fax 601-576-6955
mdah.state.ms.us

September 30, 2005

Mr. Don L. Klima, Director
Office of Federal Agency Programs
Advisory Council on Historic Preservation
1100 Pennsylvania Avenue, NW, Suite 803
Washington, DC 20004

RE: Memorandum of Agreement Concerning the Old Biloxi Hanger at Keesler Air Force Base, Biloxi, Mississippi

Dear Mr. Klima:

Enclosed is a Memorandum of Agreement (MOA) signed by the Air Force authorities and H. T. Holmes, the Mississippi State Historic Preservation Officer, agreeing to the appropriate mitigation for the demolition of the Old Biloxi Hanger at Keesler Air Force Base. We have been in consultation with Keesler Air Force Base personnel for several years hoping to find a way to save the only building on the airbase eligible for listing in the National Register of Historic Places, a World War II era hanger building.

Reluctantly, we have concluded, due to the location and configuration of the hanger, in the middle of the flight line, there is no way the building can be re-adapted to the needs of the airbase and it constitutes an obstacle to the development of a new flight line plan critical to the mission of the airbase. Therefore, we have agreed to the preparation of the enclosed MOA, obtained the specified HABS and photographic documentation, and signed the MOA. We are now forwarding it to you for your review and consideration. Since the preparation of the MOA, the hanger suffered significant, but not catastrophic damage from Hurricane Katrina.

Also enclosed are several photocopies of images of the hanger building so you can have some idea of the structure in question. If you need any further information or have questions concerning this matter, please contact me or Tom Waggener, Review and Compliance Officer at 601-576-6940.

Sincerely,

Ken P'Pool

Kenneth H. P'Pool
Deputy State Historic Preservation Officer

MISSISSIPPI Department of
MDAH
ARCHIVES & HISTORY

HISTORIC PRESERVATION
PO Box 571, Jackson, MS 39205-0571
601-576-6940 • Fax 601-576-6955
mdah.state.ms.us

August 9, 2006

Mr. George Daniel
Environmental Flight
81 CES/CEV
508 L Street
Keesler AFB, Mississippi 39534

RE: Proposed Environmental Assessment for Hurricane Katrina recovery,
MDAH Project Log # 07-174-06, Harrison County

Dear Mr. Daniel:

We have reviewed your request for a cultural resources assessment for the above referenced project in accordance with our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. After reviewing the information provided, it is our determination that no properties listed in or eligible for listing in the National Register of Historic Places will be affected. Therefore, we have no reservations with the proposed project.

In addition, we are not aware of any potential of this undertaking to affect Indian cultural or religious sites. However, if you require confirmation of this, the tribal entities will have to be contacted directly.

Should there be additional work in connection with the project, or any changes in the scope of work, please let us know in order that we may provide you with appropriate comments in compliance with the above referenced regulations. There remains a possibility that unrecorded cultural resources may be encountered during the project. Should this occur, we would appreciate your contacting us immediately so that we may take appropriate steps under 36 CFR 800, part 13. If we can be of further assistance, please do not hesitate to contact this office.

Sincerely,

H.T. Holmes
State Historic Preservation Officer

By: Jim Woodrick
Review and Compliance Officer

cc: Clearinghouse for Federal Programs

STATE OF MISSISSIPPI
DEPARTMENT OF FINANCE AND ADMINISTRATION

MEMORANDUM

TO: DEPARTMENT OF THE AIR FORCE
81ST CIVIL ENGINEER SQUADRON
508 L STREET
KEESLER AFB MS 39534 2115

DATE: AUG 16 2006

FROM: STATE CLEARINGHOUSE FOR FEDERAL PROGRAMS

SUBJECT: REVIEW COMMENTS - Activity:
PREPARATION OF ENVIRONMENTAL ASSSESSMENT FOR HURRICANE KATRINA RECOVERY AND OTHER REDEVELOPMENT EFFORTS IN SUPPORT OF THE CAPITAL IMPROVEMENTS PROGRAM (CIP). WRITTEN COMMENTS SHOULD BE DIRECTED TO GEORGE DANIEL AT ABOVE ADDRESS.

State Application Identifier Number MS060728-004R

Location: HARRISON

Contact: GEORGE DANIEL

The State Clearinghouse, in cooperation with state agencies interested or possibly affected, has completed the review process for the activity described above.

INTERGOVERNMENTAL REVIEW PROCESS COMPLIANCE:

(✓) We are enclosing the comments received from the state agencies for your consideration and appropriate actions. The remaining agencies involved in the review did not have comments or recommendations to offer at this time. A copy of this letter is to be attached to the application as evidence of compliance with Executive Order 12372 review requirements.

( ) Conditional clearance pending Archives and History's approval.

( ) None of the state agencies involved in the review had comments or recommendations to offer at this time. This concludes the State Clearinghouse review, and we encourage appropriate action as soon as possible. A copy of this letter is to be attached to the application as evidence of compliance with Executive Order 12372 review requirements.

( ) The review of this activity is being extended for a period not to exceed 60 days from the receipt of notification to allow adequate time for review.

COASTAL PROGRAM COMPLIANCE (Coastal area activities only):

( ) The activity has been reviewed and complies with the Mississippi Coastal Program. A consistency certification is to be issued by the Mississippi Department of Marine Resources in accordance with the Coastal Zone Management Act.

( ) The activity has been reviewed and does not comply with the Mississippi Coastal Program.

MS060728-004R

MISSISSIPPI Department of
MDAH
ARCHIVES & HISTORY

HISTORIC PRESERVATION
PO Box 571, Jackson, MS 39205-0571
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RECEIVED

AUG 14 2006

DEPARTMENT OF FINANCE AND ADMINISTRATION
OFFICE OF BUDGET AND FUND MANAGEMENT

August 9, 2006

Mr. George Daniel
Environmental Flight
81 CES/CEV
508 L Street
Keesler AFB, Mississippi 39534

RE: Proposed Environmental Assessment for Hurricane Katrina recovery,
MDAH Project Log # 07-174-06, Harrison County

Dear Mr. Daniel:

We have reviewed your request for a cultural resources assessment for the above referenced project in accordance with our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. After reviewing the information provided, it is our determination that no properties listed in or eligible for listing in the National Register of Historic Places will be affected. Therefore, we have no reservations with the proposed project.

In addition, we are not aware of any potential of this undertaking to affect Indian cultural or religious sites. However, if you require confirmation of this, the tribal entities will have to be contacted directly.

Should there be additional work in connection with the project, or any changes in the scope of work, please let us know in order that we may provide you with appropriate comments in compliance with the above referenced regulations. There remains a possibility that unrecorded cultural resources may be encountered during the project. Should this occur, we would appreciate your contacting us immediately so that we may take appropriate steps under 36 CFR 800, part 13. If we can be of further assistance, please do not hesitate to contact this office.

Sincerely,

H.T. Holmes
State Historic Preservation Officer

By: Jim Woodrick
Review and Compliance Officer

cc: Clearinghouse for Federal Programs

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

File 20
[illegible]

FEB 10 [illegible]

Lt Col Ray A. Mottley
Commander
81st Civil Engineer Squadron
508 L Street
Keesler AFB MS 39534-2115

Dr. Tom McCulloch
Advisory Council on Historic Preservation
Old Post Office Building, Room 809
1100 Pennsylvania Ave. NW
Washington DC 20004-2604

Dear Dr. McCulloch

Reference your phone conversation on 7 Feb 06 with Mr. George Daniel concerning the demolition of building 0228 (Biloxi Hangar) at Keesler Air Force Base, Mississippi. Attached is a signed copy of the Memorandum of Agreement which has been signed by the SHPO for your review and signature. Please return a signed copy of the MOA for our files.

Please direct questions to Mr. George Daniel at (228) 377-5823 or email: george.daniel@keesler.af.mil.

Sincerely

RAY A. MOTTLEY, Lt Col, USAF

4 Attachments:
1. MDAH MOA, dated 30 Sep 05
2. Letter to MS Depart of Archives and History, dated 4 Jan 05
3. Building 0228 Blue Prints
4. Building 0228 Photos

MEMORANDUM OF AGREEMENT
SUBMITTED TO THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
PURSUANT TO 36 CFR & 800.6(a)

WHEREAS, the 81st Training Wing (81 TRW), Keesler AFB, Biloxi, MS has determined demolition will have an effect upon Hangar 0228, a property eligible for inclusion in the National Register of Historic Places, and has consulted with the Mississippi State Historic Preservation Officer (SHPO) pursuant to 36 CFR Part 800, regulations implementing Section 106 of the National Historic Preservation Act (16 U. S. C. 470f); and

WHEREAS, representatives of the 81 TRW and Mississippi SHPO (Mr. Thomas Waggener) exchanged consultation as evidenced by attached letters and held telephone conversations discussing the matter of demolishing this hangar and,

WHEREAS, professional historic preservationists, including Mississippi SHPO staff, have recommended Historic American Building Survey (HABS) documentation as appropriate mitigation in the event the 81 TRW finds it necessary to demolish Hangar 0228 as evidenced by documentation attached; and

WHEREAS, HABS quality documentation of Hangar 0228 is provided by 81 TRW to the Mississippi SHPO as included in this MOA.

NOW, THEREFORE, 81 TRW and the Mississippi SHPO agree this undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

81 TRW will insure the following measures are carried out:

1. 81 TRW will exhaust all efforts to utilize architectural elements that can be feasibly salvaged from Hangar 0228 and will assist, as appropriate, in that utilization.

2. Reproducible copies of the original building drawings will be permanently maintained by the 81 TRW base engineers.

3. Hangar photograph negatives will be permanently maintained by the Keesler AFB History Office Audio/Visual Information Center.

4. 81 TRW will offer HABS quality documentation and photographic records of Hangar 0228 to the Keesler AFB Historical Preservation Office to facilitate local accessibility and archival storage of documentation on this structure.

Execution of this Memorandum of Agreement by 81 TRW and the Mississippi SHPO, its subsequent acceptance by the council, and implementation of its terms, are evidence 81 TRW has afforded the council an opportunity to comment on the demolition of Hangar 0228 and its effects on historic properties, and 81 TRW has taken into account the effects of the undertaking on historic properties.

By: ______________________ Date: 22 JUNE 2005

BRIAN DRAKE
81 CES Deputy Base Civil Engineer

81 TRW HISTORIC PRESERVATION OFFICER

By: ______________________ Date: 23 JUNE 2005

81st TRAINING WING, KEESLER AIR FORCE BASE, MISSISSIPPI

By: ______________________ Date: 6 JULY 05

DOUGLAS C. HAYNER, Colonel, USAF
Vice Commander

MISSISSIPPI STATE HISTORIC PRESERVATION OFFICER

By: ______________________ Date: 08.25.2005

ACCEPTED for the Advisory Council on Historic Preservation

By: ______________________ Date: 2/22/06

3 Attachments:
1. Correspondence
2. Drawings
3. Photos

Appendix B

Capability Analysis

APPENDIX B

CAPABILITY ANALYSIS

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FINAL

CAPABILITY ANALYSIS

HURRICANE KATRINA RECOVERY AND INSTALLATION DEVELOPMENT AT KEESLER AIR FORCE BASE, MISSISSIPPI

United States Air Force
Air Education and Training Command
Keesler Air Force Base, Mississippi

October 2006

ACRONYMS AND ABBREVIATIONS

A	ampere
AC	Advisory Circular
ADSL	Average Daily Student Load
AETC	Air Education and Training Command
AFB	Air Force Base
AFH	Air Force Handbook
ANSI	American National Standards Institute
CIP	Capital Improvements Plan
dB	decibel
dBA	A-weighted decibel
EA	Environmental Assessment
EIA	Economic Impact Analysis
EP	effective population
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FICON	Federal Interagency Committee on Noise
FICUN	Federal Interagency Committee on Urban Noise
FY	fiscal year
gpm	gallons per minute
Hz	hertz
IMC	Instrumentation Meteorological Conditions
kV	kilovolt
KVA	kilovolt-ampere
KW	kilowatt
KWh	kilowatt-hour
L_{dn}	Day-Night Average Sound Level
Mcf	thousand cubic feet
Mcf/day	thousand cubic feet per day
MFH	Military Family Housing
mg	million gallons
mgd	million gallons per day
MPCo	Mississippi Power Company
MW	megawatt
MWh	megawatt-hour
NA	not applicable
N/A	not available
NPS	non-prior service
psig	pounds per square inch gauge
PP	permanent party
SAIC	Science Applications International Corporation
TLF	Temporary Lodging Facilities
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
VA	United States Department of Veterans Affairs
VAQ	Visiting Airmen’s Quarters
VOQ	Visiting Officers’ Quarters
VQ	Visiting Quarters
VMC	Visual Meteorological Conditions

FINAL

Capability Analysis

Hurricane Katrina Recovery and Installation Development Program at Keesler Air Force Base, Mississippi

Department of the Air Force
81st Training Wing
Keesler Air Force Base, Mississippi

October 2006

This Report Printed on 20% Recycled Paper

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Executive Summary

EXECUTIVE SUMMARY

The objective of this Capability Analysis is to quantify sustainable non-flying and flying mission growth through the year 2013. The parameters evaluated in this Capability Analysis were analyzed only to that level of detail required to determine a general capacity for growth. The growth potential identified in this Capability Analysis will be used to define a potential development alternative to be assessed in the Installation Development Environmental Assessment.

Keesler Air Force Base was damaged by Hurricane Katrina and lost the full use of some areas of the installation due to advised changes in the Special Flood Hazard Area (100-year floodplain). The new floodplain, as drafted by the Federal Emergency Management Agency, has changed in elevation from 11 to 16 feet above sea level, but compliance with the new floodplain is not currently a legislative requirement. This change primarily impacts the base's ability to rebuild the same number of Military Family Housing units that existed prior to the hurricane. However, Keesler Air Force Base could house more people on the remaining land classified for housing by more intensive rebuilding (resulting in increased population density), which would compensate for the land lost to the increased floodplain. The purpose of this Capability Analysis is to define the maximum development potential for Keesler Air Force Base considering the floodplain and other factors that limit expansion. Some of the other limiting factors considered for Keesler Air Force Base include available land outside the clear zones, available potable water from base supply wells, available airfield capacity, and limitations on the noise environment associated with the air space.

The housing analysis presented in Section 2.1 suggests that the base has the potential to accommodate a total of 11,716 additional people: 5,360 military and civilian personnel, 1,178 on-base dependents, 4,522 students, and 656 visitors. In terms of the equivalent 24-hour effective service population, the base has the potential to accommodate 8,289 in addition to the 2004 effective population. The housing capability and population figures were based on future dormitory additions (both currently planned and unplanned) and assumed the ratio between on-base and off-base population in 2004 remained unchanged. The housing analysis included the addition of specific new unplanned dormitory facilities and considered increasing the density of future planned units.

The land use analysis presented in Section 2.2 suggests that an additional 11,664 persons could be supported by future and planned additions to base facilities. The difference between the estimates of population that can be supported based on housing and land use analyses results from use of site-wide averaging in the estimate based on land use. This averaging impacts the number of developable acres of land as well as the development density that determines estimated building space, population, and pavements for all land use types.

The utility system analysis presented in Section 2.3 suggests that sewer system lift station pump upgrades would be required prior to utilizing the headroom associated with potable water and available future building spaces. The electrical system and gas supply systems do not presently limit growth. The potable water analysis indicated an estimated 9,400 effective service population could be supported in addition to the 2004 effective population. This translates into approximately 13,000 total additional population based on 2004 population statistics.

The airfield analysis presented in Section 3 indicates there is room for 60 percent growth in the current C130-J aircraft operations without significantly impacting the identified sensitive noise receptors surrounding Keesler Air Force Base. The airfield would still have unused capacity after a 60 percent increase in C130-J aircraft operations. This 60 percent increase in C130-J aircraft translates into an overall increase in operations of 15 percent.

Table ES-1 summarizes the findings in this Capability Analysis. Keesler Air Force Base appears to have the capability to construct an additional 4,040,886 square feet of facilities and associated pavements, provided the required demolition of 1,238,558 square feet of existing outdated facilities is implemented, resulting in a net increase of 2,802,329 square feet of building space. Keesler Air Force Base can also increase its current C130-J aircraft operations by up to 60 percent, resulting in a total operations increase of 15 percent. The increase in building space and operations would support up to 11,716 additional personnel (inclusive of students, military and civilian personnel, and dependents living on base), based on the housing analysis and potentially available utility resources.

Table ES-1
Summary of Resource Constraints on Potential Development

Resource Usage Category	Allocation or Capability	Percent Utilized Base wide	Remaining Capability	Additional Population Supported
Base Lands (acres)	1,558	92 percent	131	Not applicable
Current and Future Building Space (square feet)	15,088,180	83 percent	2,802,329	11,716
Potable Water (million gallons per day)	6.12	38 percent	3.79	13,000
Electrical System (megawatt-hour)	612,898	26 percent	451,030	Not applicable
Gas System (thousand cubic feet per hour)	225	56 percent	98.3	Not applicable
Sewer System (million gallons per day)	3.24	60 percent	1.29	Not applicable

Note: Calculation details provided in Appendices A, B, and C.

Housing analysis estimated an 11,716 additional total population (8,345 effective population) could be supported based on future dormitory additions, assuming base year 2004 ratios between on- and off-base housing populations remain constant (Table 2-3).
Potable water analysis estimated approximately 13,000 additional total population (9,400 additional effective service population) could be supported, based on 2004 population data (Appendix A).
Detailed land use analysis estimated an additional 11,664 total population could be supported by future and planned additions to base facilities (Appendix B).

Chapter 1

Introduction

CHAPTER 1

INTRODUCTION

1.1 PURPOSE

The purpose of this Capability Analysis is to define development potential for Keesler Air Force Base (AFB), Mississippi (Figure 1-1), considering limiting factors. The primary objective is to quantify sustainable non-flying and flying mission growth through the year 2013.

The 81st Training Wing at Keesler AFB is planning future installation development based on the current Capital Improvements Plan (CIP) and Hurricane Katrina recovery projects. These activities would improve the effectiveness of training, replace inadequate facilities, correct current deficiencies, accommodate new mission activities, and replace damaged facilities from Hurricane Katrina.

The information provided in this document will be the basis for a subsequent Hurricane Katrina Recovery/Installation Development Environmental Assessment (EA). The growth potential quantified in this Capability Analysis will be used to define a potential development alternative to be assessed in the Installation Development EA.

1.2 GENERAL METHODOLOGY AND APPROACH

This Capability Analysis will provide information on development potential for Keesler AFB. The Capability Analysis is presented in two major sections: the Non-flying Mission and the Flying Mission. As part of the Non-flying Mission evaluation (Figure 1-2), the Capability Analysis determines the supportable population at Keesler AFB based on housing capability (Section 2.1). The Capability Analysis also considers the net acreage available for development in each land use category (Section 2.2) that is free of any physical and/or operational constraints (i.e., floodplains, height constraints, safety easements, Environmental Restoration Program sites, wetlands). The analysis also examines the base's ability to provide basic infrastructure support to the expanded population and facilities (Section 2.3). Flying mission capability is assessed by considering increased flight operations, the effect these increases would have on noise around the airfield, the physical throughput capacity of the airfield and air traffic control, and possible availability constraints on military training airspace supporting unit operations (Section 3.0).

Figure 1-1 Location of Keesler Air Force Base, Mississippi

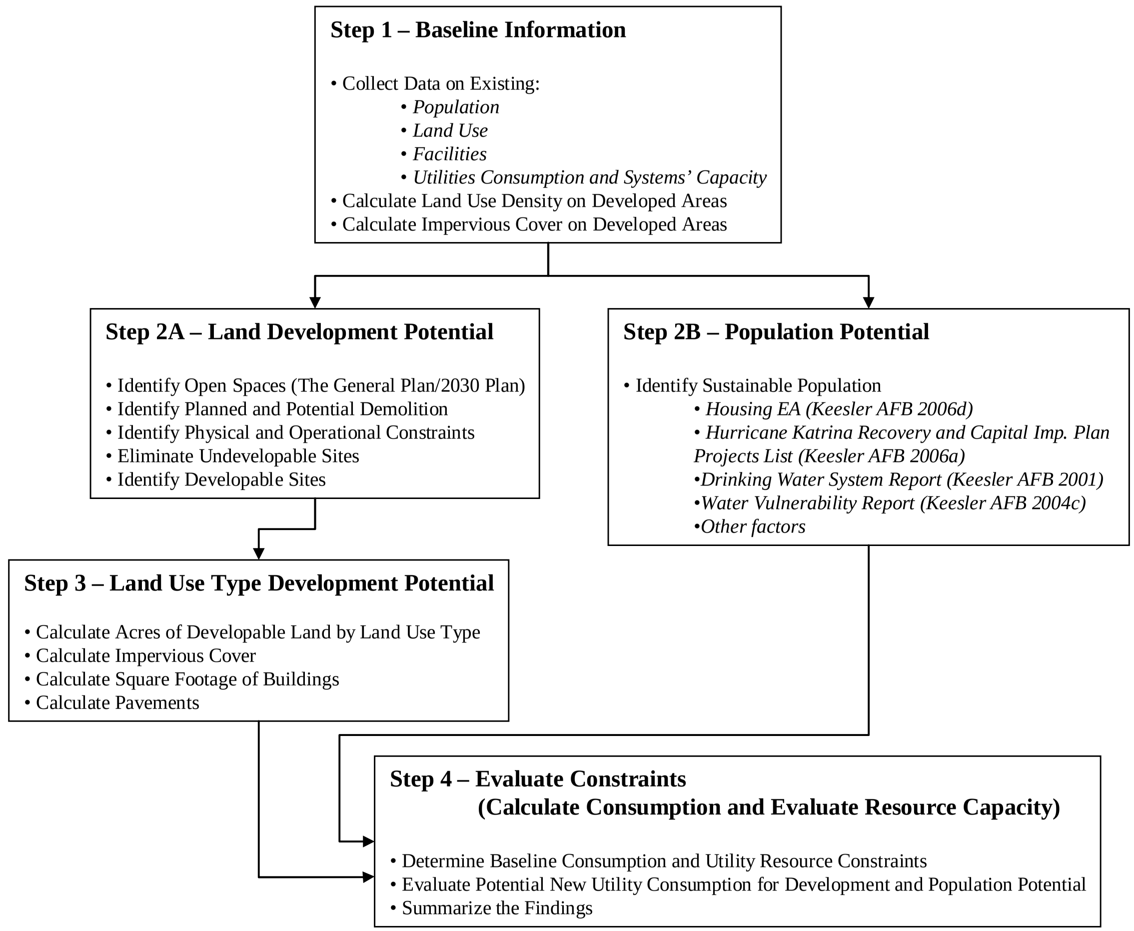

Figure 1-2 Process Flow Diagram

Although the Keesler AFB *General Plan* includes a proposed land use plan that is intended to guide the location and type of physical development at the base, this plan is currently being updated to reflect changes that have occurred since its preparation (Keesler AFB 2004a). During development of this Capability Analysis, it was determined that the *General Plan* and the most recent land use data obtained from the base graphical files do not adequately represent the currently planned projects or the impact of Hurricane Katrina on land usability. Therefore, a new future land use map for Keesler AFB was developed during the course of this Capability Analysis and was used to determine the development capability and to identify land use constraints.

After determining the current baseline conditions, the first step in the Capability Analysis was to determine the sustainable population based on potential housing availability. The next step was to determine the maximum installation development potential based on available acreage per land use category from the future land use map. For Keesler AFB, the evaluation of available acreage included a review of all vacant and underutilized parcels, including land associated with facilities that would exceed a recommended life expectancy of 67 years within the planning period, or facilities associated with scheduled demolition, which would potentially be available for reassignment (Air Education and Training Command [AETC] 2006a). The resulting maximum developable land area and corresponding sustainable population were then evaluated with respect to potentially limiting factors such as utility systems. Finally, the flying capacity at the airfield and the associated training airspace, as well as the noise environment surrounding Keesler AFB and the training airspace used were evaluated to determine the maximum growth potential for the flying mission.

Chapter 2

Non-Flying Mission Capability

CHAPTER 2

NON-FLYING MISSION CAPABILITY

2.1 SUSTAINABLE POPULATION EVALUATION

2.1.1 Baseline Population

This Capability Analysis references the fiscal year (FY) 2004 population data reported in the Economic Impact Analysis (EIA) and the 2004 Keesler Lodging Occupancy Report to determine baseline population data (Keesler AFB 2004b and AETC 2006b). For purposes of this study, the estimate of base population restricts the extended population only to those members who would have a recognizable effect upon the base resources that could potentially limit growth (i.e., all personnel, students, on-base dependents, and transient personnel). In total, the 2004 baseline population of Keesler AFB is 18,201 persons (inclusive of all personnel, students, on-base dependents, and overnight visitors). Off-base dependents and students are estimated from the breakdown between on- and off-base military personnel and students and civilian personnel numbers reported in the EIA (Keesler AFB 2004b). Table 2-1 provides a summary of the baseline population at Keesler AFB used for this Capability Analysis. Appendix A (Tables A-1 through A-4) explains details and assumptions used in obtaining this population estimate.

As referenced in Table 2-1, there is a total 2004 baseline population of 18,201 persons comprising the military and dependents residing on base, military and civilian employees residing off base, and students residing on base at Keesler AFB. The effective population (EP) of 12,878 is an estimate of the equivalent 24-hour population served by Keesler AFB's utility systems. On-base residents use the utility systems at home and at work (i.e., 24 hours), while off-base residents are served only at work (i.e., 8 hours). Therefore, on-base residents have an EP factor of 1.00, but off-base residents, who are only present one-third of the 24-hour period, have an EP factor of approximately 0.33. EP will be used as a yardstick for measuring the capacity of those utility systems (i.e., water, sanitary sewer, and electrical) with population dependent usage rates (Section 2.3). Table 2-2 provides a summary of the baseline EP at Keesler AFB used for this Capability Analysis.

Table 2-1
2004 Baseline Total Population, Keesler AFB

Classification	Living on Base	Living off Base	Total
Military Personnel[1]	2,046	4,136	6,182
Civilian Personnel[2]	0	3,849	3,849
Average Daily Student Load[3]	4,476	0	4,476
Military Dependents[4]	2,328	NA[6]	2,328[6]
Transient Personnel[5]	1,366	0	1,366
Total Population[6]	10,216	7,985[6]	18,201[6]

Source: FY2004 EIA (Keesler AFB 2004b), FY2004 Keesler Lodging Occupancy Report (AETC 2006b)

Notes:

[1]Thirty-three percent of military personnel estimated as on-base residents and 67 percent as off-base residents based on data obtained from the 2004 EIA. The military personnel figure was obtained by subtracting the ADSL from the data provided in the "Military/Student Personnel" category.

[2]The civilian personnel category includes all civil service, non-tax funded, contract, and all other non-military employees.

[3]ADSL provided in 2004 EIA. Assumed 100 percent of ADSL live on base, based on information obtained from the 81st Training Wing Public Affairs Office (Keesler AFB 2006c).

[4]Thirty-three percent of dependents estimated as on-base residents and 67 percent as off-base residents based on data obtained from the 2004 EIA for Military Family Members. Assumed the same average number of dependents for military personnel residing in both on- and off-base housing.

[5]Transient personnel estimated from the number of rooms and the average annual occupancy as reported in the FY2004 Keesler Lodging Occupancy Report for the following: Visiting Officers' Quarters, Visiting Airman's Quarters, Visiting Quarters, and Temporary Lodging Facility.

[6]Total population for this Capability Analysis excludes off-base dependents, retirees, and other members of the base extended population that have no significant effect on the availability of on-base resources (Appendix A, Table A-4).

ADSL Average Daily Student Load
AETC Air Education and Training Command
AFB Air Force Base
EIA Economic Impact Analysis
FY fiscal year
NA not applicable

Table 2-2
2004 Baseline Effective Service Population, Keesler AFB

Category	Population	Effective Population Factor	Effective Population
Military on Base	2,046	1.00	2,046
Dependents on Base	2,328	1.00	2,328
Military off Base	4,136	0.3333	1,379
Trainees/Cadets on Base	4,476	1.00	4,476
Trainees/Cadets off Base	0	0.3333	0
Civilian Employees	3,849	0.3333	1,283
Transient Personnel	1,366	1.00	1,366
Total	18,201	--	12,878

Source: Appendix A (Tables A-1, A-2, A-3, and A-4); Keesler AFB 2004b, 2006b, 2006c; AETC 2006b

2.1.2 Limiting Factors

The most limiting factor on population at Keesler AFB appears to be available land outside of the 100-year floodplain (Federal Emergency Management Agency [FEMA] 2006) and the 3,000-foot airfield clear zone that meets all other land use restrictions upon which accompanied and unaccompanied housing can be built. The next most limiting factor appears to be available potable water from the base supply wells. Available land is evaluated in more detail in Section 2.2 and available potable water is evaluated in Section 2.3.

2.1.3 Maximum Population

Potential population at Keesler AFB was derived based upon an analysis of the housing potential on the base. This analysis includes a review of all Military Family Housing (MFH), permanent party (PP) personnel dormitories, technical training student housing for non-prior service (NPS) personnel, and all other lodging including the Visiting Officers' Quarters (VOQ), Visiting Airmen's Quarters (VAQ), Visiting Quarters (VQ), and Temporary Lodging Facilities (TLF). Table 2-3 presents the current, planned, and maximum population capacity for Keesler AFB based on housing availability. Tables A-5, A-6, and A-7 in Appendix A present additional details associated with this estimate of future population.

Prior to Hurricane Katrina (August 2005), there were 1,820 MFH units in the various accompanied housing areas. After the hurricane, only 865 MFH units remained useable (Keesler AFB 2006d). Currently, approved plans to demolish all MFH areas and rebuild 1,067 units in the MFH areas located west of the base will result in a net loss of 753 MFH units and the reclassification of 169 acres formerly classified as accompanied housing acres from the Oak Park, Pine Haven, and North Hanson MFH areas to other land uses (Keesler AFB 2006e). The existing land uses are depicted on Figure 2-1.

Plans presented in the 2004 CIP (Keesler AFB 2004a) and a list of currently planned projects (Keesler AFB 2006a) indicate that 1,414 PP dormitory units will eventually be demolished and replaced by 672 units, resulting in a net loss of 742 units. The *General Plan* (Keesler AFB 2004a) indicates that ten 164-person PP dormitories are compatible with the new PP dormitory area, but the present list of CIP projects includes four 144-person dormitories and one 96-person dormitory planned for the PP Dormitory area (Keesler AFB 2006a).

Most of NPS dormitories have recently been replaced as part of an ongoing program in the Triangle Vision Area Development Plan (Keesler AFB 2004a). Presently there are 1,839 NPS dormitory units (3,678 beds), but 240 units (480 beds) are presently being used to house construction contractors. The current list of CIP projects (Keesler AFB 2006a) includes construction of two more 250-unit NPS dormitories (totaling 1,000 beds) and the demolition of the 240 units (480 beds) presently housing contractors. The final planned number of NPS dormitory units is 2,099 (totaling 4,198 beds).

Table 2-3
On-base Housing Analysis

Category	Baseline (2004) Population[1]	Current (2006) Housing Capability[2]	Planned Future Housing Capability[3]	Maximum Future Housing Capability[4]
Accompanied Housing (MFH)	2,046 military 2,328 dependent	865 military 3,244 dependent	1,067 military 3,506 dependent	1,067 military 3,506 dependent
Unaccompanied Permanent Party Housing		1,414	672	1,244
Student Housing	4,476	3,678	4,198	8,998
Transient Housing	1,367	1,702	2,022	2,022
Total[5]	6,522 military 2,328 dependent 1,367 transient	5,957 military 3,244 dependent 1,702 transient	5,937 military 3,506 dependent 2,022 transient	11,309 military 3,506 dependent 2,022 transient

Source: Appendix A (Tables A-4, A-5, A-6, and A-7), FY2004 EIA (Keesler AFB 2004b), FY2004 Keesler Lodging Occupancy Report (AETC 2006b), Form 7115 Real Property Data (Keesler AFB 2006b), 2004 CIP (Keesler AFB 2004a), 2004 General Plan (Keesler AFB 2004a), 2006 Updated CIP and Hurricane Katrina Recovery Projects List (Keesler AFB 2006a), and *Revitalization of MFH EA* (Keesler AFB 2006d)

Notes:
[1]Baseline population data obtained from Table 2-1 of this report.
[2]Current housing capability based on April 2006 Real Property Data extracted from ACES (Keesler AFB 2006b).
[3]Planned housing capability based on 2004 General Plan and CIP, 2006 updates to the CIP, 2006 Hurricane Katrina Recovery Projects, and the 2006 Housing EA.
[4]Maximum housing capability based on building new student and permanent party dorms at double the current development density in spaces identified as available for development in Section 2.2 and Appendix B of this report. For unaccompanied housing, see Table A-5. For student housing calculation is as follows (4,198 +3*1,600 = 8,998).
[5]Total on-base estimate for military population capability includes all Transient Housing, Student Housing, Unaccompanied Permanent Party Housing, and Accompanied Housing. Dependent housing capability estimates are based upon the 2006 *Revitalization of MFH EA* (Keesler AFB 2006d), which estimated current housing averaging 3.75 bedrooms per unit and planned housing averaging 3.29 bedrooms per unit, assuming one dependent per bedroom.

AETC Air Education and Training Command
AFB Air Force Base
CIP Capital Improvements Plan
EA Environmental Assessment
EIA Economic Impact Analysis
FY fiscal year
MFH Military Family Housing

There are no other currently planned on-base NPS facilities; however, the reclassification of a parcel of land within the western portion of the former Oak Park MFH area located northeast of the airfield and outside of the 3000-foot clear zone would allow for an additional three NPS dormitories and associated facilities to be constructed (Figure 2-2). Height restrictions apply to these areas based on their presence within the transition and inner horizontal surface zones of the airstrip. New facilities can be placed anywhere in this vicinity outside of the clear zone provided they are less than 140 feet tall (Keesler AFB 2004a). The height restrictions in this area would allow for up to eleven stories to be constructed, which is approximately four times the height of the existing 400-person NPS dormitories upon which the estimated construction footprint was established (Keesler AFB 2006b).

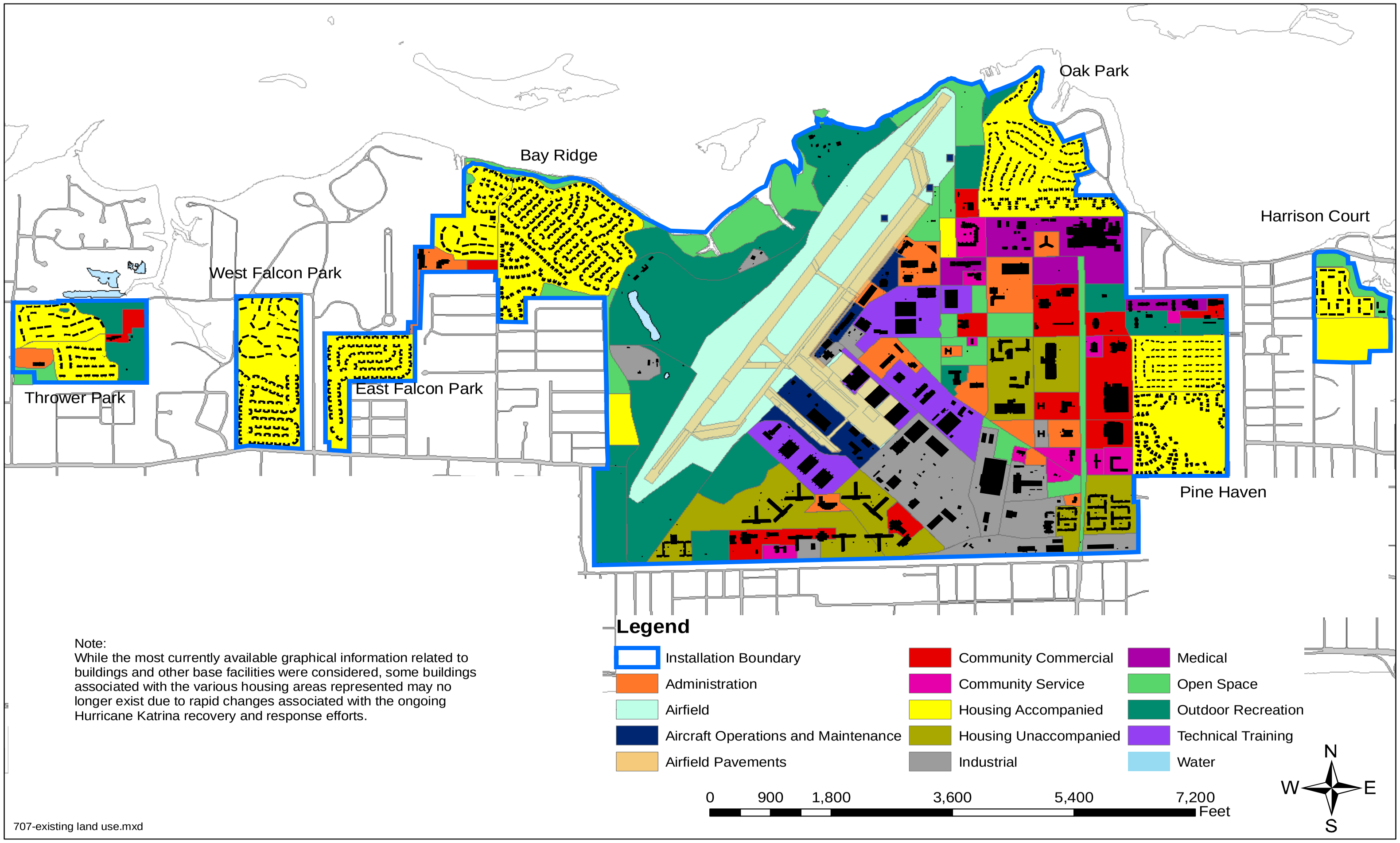

Figure 2-1 Existing Land Use, Keesler Air Force Base, Mississippi

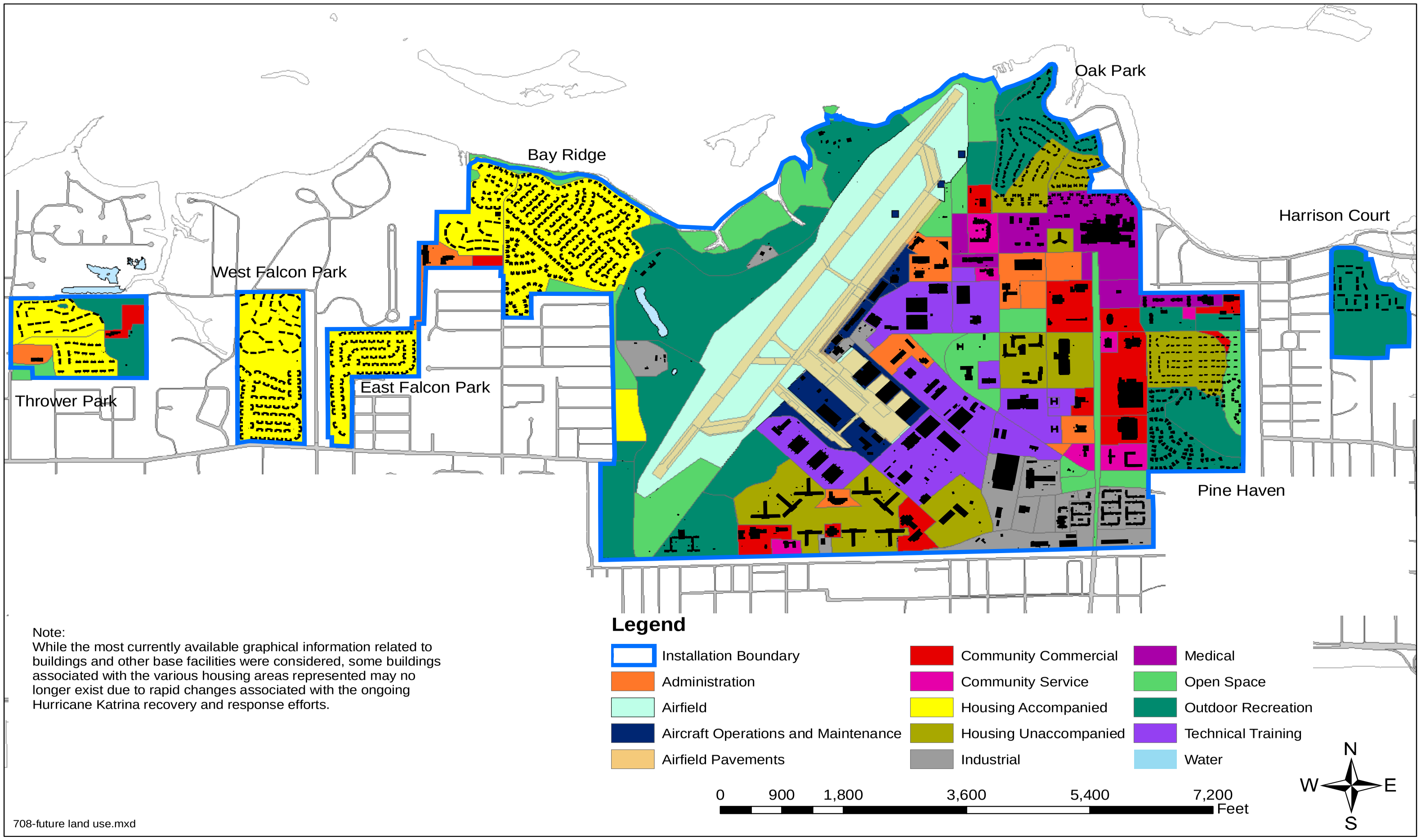

Figure 2-2 Future Land Use, Keesler Air Force Base, Mississippi

Presently there are 336 VOQ units, 836 VAQ units, 480 VQ units, and 50 TLF units on base. Construction plans listed in the current CIP (Keesler AFB 2006a) include the addition of 320 units of VQ lodging. There are no other plans for additions to these facilities.

2.1.4 Summary of Population

Planned construction of new housing will not achieve the baseline housing capacity that existed in 2004. The on-base accommodation of population growth at Keesler AFB could be achieved through construction of taller dormitories in areas where planned projects are not presently located. Table 2-3 and information presented in Appendix A (Table A-6) illustrate that construction of three 1,600-person NPS dormitories and doubling the currently planned capacity of four of the five planned PP dormitories would provide sufficient room for population growth at Keesler AFB.

The potential on-base housing capacity suggests that the effective service population could be increased by a factor of 1.65 provided other base resources could accommodate the higher demand. The additional total population that could be supported by the base totals 11,716 people: 5,360 military and civilian personnel, 1,178 on-base resident dependents, 4,522 students, and 656 visitors. The associated net effective population added would be 8,289. Appendix A (Table A-7) provides additional detail.

2.2 LAND USE EVALUATION

The *General Plan* provides the foundation of this analysis (Keesler AFB 2004a). Changes from the existing land uses to the planned future land uses are quantified in the following section. The following section also provides an evaluation of developable spaces by land use type. Additional details related to the developable parcels can be found in Appendix B.

2.2.1 Current and Future Land Use

As identified in the *General Plan* (Keesler AFB 2004a), there is limited open and undeveloped space on Keesler AFB. The installation's goal has been to consolidate compatible functions within the same land use areas to improve operational efficiency and safety, improve traffic circulation patterns, and provide aesthetic areas that enhance the quality of life for personnel. The land use categories used by the Air Force are defined in Table 2-4. Figure 2-1 presents the current distribution of land uses for Keesler AFB. Accompanied housing is the base's largest category, accounting for 400 acres of the base's total acreage.

Table 2-4
Land Use Categories

Land Use Categories	Description
Aircraft Operations and Maintenance	Base operations, control tower, fire station, maintenance hangers, shops, and docks.
Administrative	Headquarters, civilian personnel, education center, law center, and security operations.
Airfield	Aircraft operating areas.
Airfield Pavement	Runways, taxiways, and aprons.
Community Commercial	Commissary, exchange, club, dinning hall, recreation center, gym, and theater.
Community Service	Post office, library, chapel, childcare center, and education center.
Housing Accompanied	Family housing.
Housing Unaccompanied	Dormitories and visitors housing.
Industrial	Base engineering, maintenance shops, storage, warehousing, and utilities.
Medical	Hospital, clinic, and medical storage.
Open Space/Roads	Conservation area, buffer space, and undeveloped land.
Outdoor Recreation	Swimming pool, outdoor courts and field, golf course, and marina.
Technical Training	Classroom buildings.
Water	Lake, pond, and major stream.

Due to the effects of Hurricane Katrina, a significant portion of the accompanied housing was destroyed. As a result, the future land use map was adjusted to incorporate changes associated with the proposed replacement projects and areas identified for potential development. The new future land use map presented in Figure 2-2 identifies logical land uses for most of the areas affected by the hurricane.

Table 2-5 summarizes the distribution of land uses based on the existing and future land use plans for Keesler AFB and the shift in area between existing and future land uses. As can be seen, the acreage of accompanied housing was reduced substantially as a result of the damage caused by Hurricane Katrina.

2.2.2 Limiting Factors

During the review of base aerial photographs and land use planning maps to identify potentially developable areas, discriminating factors were taken into consideration that would prevent the development. The most common discriminating factors evaluated included sites within the floodplain, the 3,000-foot clear zone, active environmental restoration program sites, established outdoor training and recreation areas, areas within projected high noise zones, wetlands, and sites that were too small to develop within established setback requirements. The 100-year floodplain used in the evaluation was established at the 16-foot contour, which is the advisory base flood elevation established by FEMA with consideration to new wave zone mapping performed after Hurricane Katrina. The 11-foot contour is the legislative requirement established under the National Flood Insurance Program which designates the special flood hazard area (100-year floodplain) (FEMA 2006).

Table 2-5
Existing and Future Land Use Acreage by Land Use Category

Land Use Type	Existing Land Use		Future Land Use[1]		Change in Land Use (acres)
	Acres	Percent Distribution	Acres	Percent Distribution	
Aircraft Operation and Maintenance	30	1.9	45	2.9	15
Administrative	72	4.6	59	3.8	-13
Airfield	126	8.1	126	8.1	0
Airfield Pavements	89	5.7	89	5.7	0
Community Commercial	84	5.4	79	5.1	-5
Community Service	29	1.9	24	1.5	-5
Housing Accompanied	400	25.7	230	14.8	-170
Housing Unaccompanied	126	8.1	150	9.6	24
Industrial	121	7.8	85	5.5	-36
Medical	52	3.3	61	3.9	9
Open Space	114	7.3	145	9.3	31
Outdoor Recreation	237	15.2	324	20.8	87
Technical Training	78	5.0	141	9.1	63
Total	1,558		1,558		

Source: The *General Plan* (Keesler AFB 2004a)
[1]Future land use was adjusted based on input from base personnel.

Two other factors were considered in the identification of developable parcels: 1) age of the building and 2) proposed project location. Air Force planning guidance identifies an average useful life of 67 years for facilities (AETC 2006a). Therefore, any area with buildings older than 67 years (through the planning period of 2013) was also considered developable. Proposed locations for future projects were also considered as potentially developable parcels with the assumption that demolition of the current buildings in the identified area would need to be demolished.

2.2.3 Maximum Developable Land

A review of base aerial photographs and land use planning maps resulted in the visual identification of 29 potentially developable parcels comprising 148 acres (Figure 2-3). Of the 29 identified sites, three sites were eliminated due to physical and operational constraints[1] (Appendix B, Table B-5).

[1] Many of the 29 sites that were included as potentially developable parcels due to proposed activities in the *General Plan* (Keesler AFB 2004a) and Hurricane Katrina Recovery projects and still have buildings or other facilities located upon them. Demolition would occur prior to construction of proposed projects.

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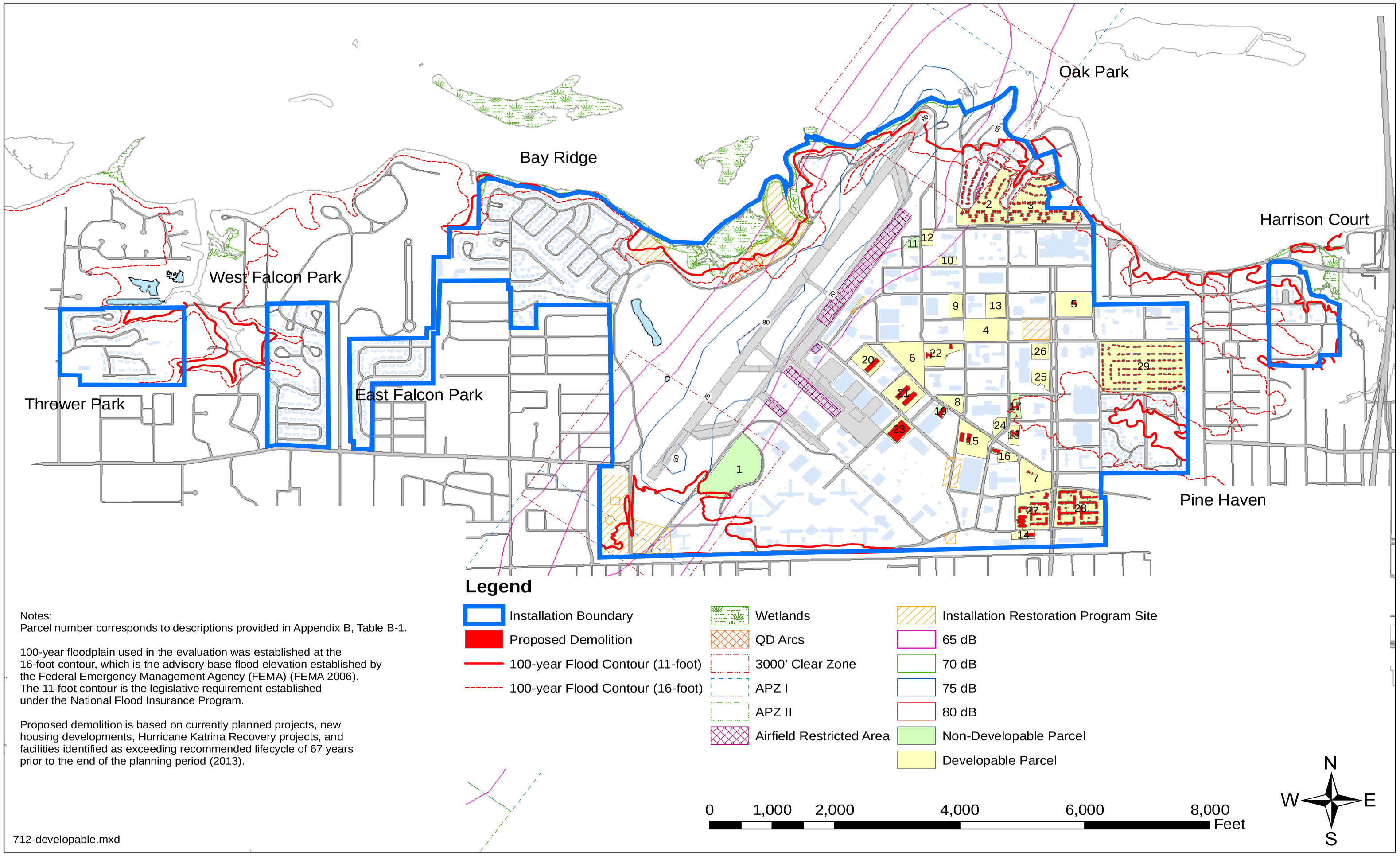

Figure 2-3 Potentially Developable Parcels, Keesler Air Force Base, Mississippi

The remaining 26 parcels (131 acres) are considered developable with the implementation of proposed demolition. The summary of available areas by land use type is presented in Table 2-6. Additional detail is presented in Appendix B, Table B-5.

Based on the current development ratios per land use area and the increased building density factors required to house the maximum population described in Section 2.1.3, the square footage of building and pavements that can be accommodated within these developable parcels was estimated. Keesler AFB can accommodate an additional 4,040,886 square feet of building space provided the associated 1,238,558 square feet of demolition is implemented. The net gain in building space would amount to 2,802,329 square feet with an accompanying 30.9 acres of pavements (including roadways, sidewalks, and parking areas). The net gain in base-wide impervious surfaces would be 62.3 acres. A summary of this potential development per land use area is provided in Table 2-7. Figure 2-3 depicts the potentially developable parcels on Keesler AFB.

Table 2-6 Developable Parcels by Land Use

Land Use Type	Developable Parcels (acres)	Non-developable Parcels (acres)
Aircraft Operation and Maintenance	1.20	0.00
Administrative	6.46	0.00
Airfield	0.00	0.00
Airfield Pavements	0.00	0.00
Community Commercial	0.95	0.00
Community Service	0.99	0.00
Housing Accompanied	0.00	0.00
Housing Unaccompanied	40.90	0.05
Industrial	20.12	0.00
Medical	12.52	0.00
Open Space	27.77	0.92
Outdoor Recreation	0.02	13.75
Technical Training	20.12	2.23
Total	**131.05**	**16.95**

Source: Appendix B (Tables B-1 and B-5)

Table 2-7
Potential Development per Land Use Category

Land Use Category	Developable Parcels (acres)	Future Building Square Footage Capability (square feet)	Total Impervious Surface Capability (acres)	Future Pavement Acreage Capability (acres)
Aircraft Operation and Maintenance	1.20	23,412	0.54	0.00
Administrative	6.46	75,777	3.31	2.09
Airfield	0.00	0.00	0.00	0.00
Airfield Pavements	0.00	0.00	0.00	0.00
Community Commercial	0.95	42,270	0.62	0.09
Community Service	0.99	311	0.46	0.31
Housing Accompanied	0.00	0.00	0.00	0.00
Housing Unaccompanied	40.90	2,866,246	20.04	8.52
Industrial	20.12	356,168	10.78	5.58
Medical	12.52	10,345	8.12	5.61
Open Space	27.77	0.00	4.60	0.00
Outdoor Recreation	0.02	0.00	0.00	0.00
Technical Training	20.12	666,356	13.87	8.67
Associated Demolition		**-1,238,558**		
Total	**131.05**	**2,802,329**	**62.35**	**30.88**
Source: Appendix B (Table B-5)				

2.3 INFRASTRUCTURE EVALUATION

2.3.1 Potable Water

Keesler AFB maintains its own potable water system (United States Environmental Protection Agency [USEPA] PWS Number 0240049) which supplies water from two aquifers (Lower Graham Ferry and Upper Pascagoula) to the base and to one off-base customer (Veterans Affairs [VA] Gulf Coast Veterans Health Care System hospital). According to historical reports, the VA's water use accounts for five percent of the demand on the water system (Keesler AFB 2001). The Keesler AFB potable water system infrastructure consists of several key assets that include four interconnections with other water systems (currently configured to be used only as an emergency source of water), 14 on-base source wells, treatment facilities, distribution and service lines, storage tanks, and fire-fighting facilities. Two of the interconnections are with the City of Biloxi water supply and two connections are with the VA (which has its own source well).

2.3.1.1 Baseline Potable Water Conditions

Currently, the Keesler AFB system includes a network of 14 water supply wells with production capacities that range from 400 gallons per minute (gpm) to 1,000 gpm (however, some are inoperable), six elevated storage tanks comprising 2.4 million gallons (mg) of storage, two 50,000-gallon fire suppression system water storage tanks, and more than 41 miles of distribution mains containing common water system appurtenances (Keesler AFB 2004c and 2006f).

All base supply wells are individually permitted with the State of Mississippi, which regulates their productive use. The source well network currently includes two abandoned source wells (Wells 6 and 7 are no longer permitted for use), three source wells that are currently inoperative due to mechanical deficiencies or failure (Wells 1, 2, and 5), and nine operational source wells (Wells 3, 4, and 8 through 14) (Keesler AFB 2004c and 2006f). The currently permitted combined production capability for all operable wells is 9.2 million gallons per day (mgd). The base voluntarily maintains water production on a 16-hour daily pumping schedule to allow for recharge within the aquifer and to reduce wear on the well infrastructure (Keesler AFB 2004c). The resulting average daily water supply is presently designed for 6.1 mgd (Keesler AFB 2006f).

Potable water consumption in FY2004 averaged approximately 2.33 mgd; the maximum daily consumption was estimated as 2.4 mgd during October 2003. More recent data from 2005 recorded a maximum daily consumption of an estimated 2.7 mgd (based on data reported in August 2005). Historical average daily average flows reported between 2001 and 2003 ranged from 2.1 to 2.3 mgd, respectively. Historical peak flows reported between 2001 and 2003 ranged from 5.2 to 3.6 mgd, respectively (Keesler AFB 2004c).

2.3.1.2 Limiting Factors on Potable Water

The typical service life of a water supply well is 25 years (Keesler AFB 2001) and the currently recommended life cycle for base facilities and infrastructure is 67 years (AETC 2006). With the exception of the recently installed Well 14, all of the base wells are greater than 25 years old and many are showing signs of deteriorating well screens as indicated by sand infiltration into the water system (Keesler AFB 2004c). Three of the six water tanks are older than 67 years, however, at the time of this analysis all tanks were either recently refurbished or were scheduled to be refurbished.

Well replacement may not necessarily result in increased production capability due to the potential for more stringent requirements on future wells imposed by the state of Mississippi in governance of the Lower Graham Ferry and Upper Pascagoula aquifers. The most recent example of this is the replacement of Well 7 with Well 14. Well 7 was permitted for 1.08 mgd, but Well 14 is only permitted for 0.413 mgd even though it demonstrated steady state recovery at 1.72 mgd (Keesler AFB 2006f).

The established maximum fire water flow condition is based on simultaneous fires at Buildings 4513 and 4514 (Keesler AFB 1994). The maximum flow was calculated as 4,000 gpm at 20 pounds per square inch of pressure for six hours, for a total consumption of 1.44 mg of water. The water storage requirement for the base includes 50 percent of the average daily potable water demand plus the fire water storage requirement. A deficit in this water storage requirement was noted in the Potable Water Vulnerability and Risk Assessment (Keesler AFB 2004c). As the base population and subsequent demand for potable water increases, the water storage capability requirement will also increase. The need for additional water storage is not an insurmountable task and could be accomplished with upgrades to the three older water tanks. The fire suppression systems at Buildings 4513 and 4514 could also be upgraded to make them less water intensive.

The four "emergency use only" water connections to off-base water distribution systems are not available unless the base water system pressure is substantially reduced (Keesler AFB 2004c). Since the identified means for reducing the base water pressure is reducing the water levels in the water tanks to such an extent that some areas of the base might be at risk for lack of fire protection, it is not presently feasible to use base system water and off-base supplied water simultaneously without infrastructure modifications (Keesler AFB 2004c).

The Potable Water Vulnerability and Risk Assessment (Keesler AFB 2004c) was based on FY2000 data. It reported that 15 percent of reported water demand was due to system losses; 13 percent was unaccounted due to line breaks, flushing, or meter errors; 10 percent was used to irrigate the golf course; and 5 percent went to the VA. These figures indicate that 43 percent of the total water demand at Keesler AFB is independent of the base population; only 57 percent of the total potable water demand is population based.

2.3.1.3 Maximum Potable Water Capability

The base potable water system is currently designed for a 6.1 mgd supply. The current potable water supply is 9.2 mgd based on the permitted capacity of all operable wells and 11.5 mgd based on the permitted capacity of all wells regardless of operability. Well refurbishing and/or well replacement would potentially improve the designed capability of the system; however, 6.1 mgd was used as the maximum capability for the planning period ending in 2013 because this level is supported by current conditions. Table 2-8 demonstrates the potable water system capability, current consumption, and surplus capability.

Table 2-8
Potable Water Capability Summary

Category	Value	Percent of Permitted Capacity	Percent of Current Design Capacity	Headroom from Designed
Water Production				
Permitted rate for all wells (mgd)	11.54	100	NA	NA
Permitted rate for operable wells (mgd)	9.16	79	NA	NA
Design rate for all wells (mgd)	7.22	63	NA	NA
Design rate for operable wells (mgd)	6.12	53	100	NA
Water Consumption				
FY2001 Average Consumption (mgd)	2.26	20	37	3.86
FY2002 Average Consumption (mgd)	2.07	18	34	4.05
FY2003 Average Consumption (mgd)	2.24	19	37	3.88
FY2004 Average Consumption (mgd)	2.33	20	38	3.79
FY2001 Historical Peak Demand (mgd)	5.17	45	84	0.95
Water Storage				
Total water storage (mg)	2.50	NA	100	NA
Estimated Storage Requirement (mg)	2.55	NA	102	(0.05)

Source: Keesler AFB 2001, Keesler AFB 2004c, and Keesler AFB 2006f

Notes:
Water storage includes six 0.4 mg tanks and two 0.05 mg tanks.
Estimated storage calculated using 50 percent of the 4-year average daily average for the period from 2001 through 2004 and adding it to the estimated worst-case fire water requirement of 1.44 mg.

AFB Air Force Base
FY fiscal year
mgd million gallons per day
mg million gallons
NA not applicable

Based on the 2004 average consumption data and the current design capability, there is a 3.79 mgd surplus in the current supply. Assuming non-population based demands on the potable water supply do not change significantly, this amount of surplus potable water would support an EP (equivalent 24-hour population) at least 30,000 additional persons based on a typical average daily per capita consumption of 101 to 125 gallons. Based on the 2001 worst-case peak flow condition and the current design capability, there is a 0.95 mgd surplus in the current potable water supply under extreme conditions. This amount of water would support an additional 7,600 to 9,400 24-hour EP, again based on the typical average daily per capita consumption.

The available potable water supplies are capable of meeting the demand associated with the projected sustainable population (see Section 2.1), provided the base supply wells and water storage and distribution infrastructure are maintained in accordance with capital improvements outlined in the 2001 Drinking Water System Report and in the 2004 Potable Water Vulnerability and Risk Assessment Report (Keesler AFB 2001 and 2004c).

2.3.2 Wastewater Collection System

Keesler AFB discharges its wastewater to two separate Harrison County wastewater treatment facilities operated by the City of Biloxi. With the exception of the Harrison Court Housing Area, Keesler AFB pumps its wastewater to the Harrison County West Biloxi Sewage Treatment Plant. The Harrison Court Housing Area discharges by gravity flow to the Keegan Bayou Plant.

2.3.2.1 Baseline Wastewater Collection System Conditions

The Keesler AFB wastewater collection system is comprised of more than 400,000 linear feet of sewer mains. Domestic sewage is collected throughout the installation via underground pipelines that range in size from two inches (for building laterals) to 30 inches (for some primary collectors). In places, pipe sections that are in excess of 40 years of age are connected to sections that were recently replaced in support of new facility construction. Sewer line materials are primarily ductile iron and polyvinyl chloride. Due to the use of force mains for much of the system, the depth of burial ranges from 4 to 30 feet. Extensive effort has been expended to replace lift station pumps because the base relies on off-site wastewater treatment facilities not available via gravity flow (Keesler AFB 2004d). The Keesler AFB wastewater collection system can accommodate a wastewater flow of approximately 3.24 mgd (Keesler AFB 2002). The estimated total annual wastewater generation is between 712,000,000 gallons and 794,000,000 gallons, or between 1.95 and 2.17 mgd of average daily wastewater flow (based on data collected from 2003 to 2005) (Keesler AFB 2006g). The typical average daily wastewater flow rate estimated in the 2004 *General Plan* (Keesler AFB 2004a) is approximately 3 mgd.

The West Biloxi Sewage Treatment Plant (National Pollutant Discharge Elimination System Permit MS0030333) provides secondary treatment of wastewater and is permitted to process 9.1 mgd during the months of June through October and 11 mgd for November through May. Effluent from the West Biloxi Sewage Treatment Plant is discharged to the Back Bay of Biloxi. Keesler AFB wastewater flows account for approximately 20 to 30 percent of the permitted average daily plant flow.

2.3.2.2 Limiting Factors on Wastewater Collection System

The present state of the Keesler AFB force mains and lift stations limit the wastewater collection system capacity to 3.24 mgd. Although, the utility service contract for the West Biloxi plant does not specifically limit the maximum daily flow rate, it does place a limit of 822,430,000 gallons per year on the annual discharge, which averages to a daily flow rate of 2.25 mgd.

The Keegan Bayou Plant contractually limits the base wastewater effluent from the Harrison Court housing area to 17,762,000 gallons per year, which averages to a daily rate of 0.05 mgd. The Harrison Court housing area will likely not be rebuilt as housing due to the recent changes in the floodplain. There may no longer be a significant need to maintain the contract with the Keegan Bayou Plant. Should significant facilities be placed within the Harrison Court area, an abandoned force main and lift station may need to be replaced, or the contract with the city to discharge to the Keegan Bayou plant will require a modification to accommodate the new wastewater flows.

The 2004 *General Plan* mentions that infiltration and needed lift station upgrades are factors that impact the wastewater system capability; however, the impact has not been quantified and projects have not been identified to address these issues (Keesler AFB 2004a).

2.3.2.3 Maximum Wastewater Collection System Capability

The present state of the force mains and lift stations limits the wastewater collection system to a maximum flow of 3.24 mgd. The present contracts with the City of Biloxi limit the annual discharge to 840,192,000 gallons (2.25 mgd for the main base and 0.05 mgd for Harrison Court). Table 2-9 demonstrates the wastewater collection system capability, current consumption, and surplus capability.

Annual consumption associated with 2004 was reported to be 87 percent of the contracted amounts and peak wastewater flows associated with 2004 were at 69 percent of the system pumping capability. The present wastewater collection system surplus is only between 0.7 mgd and 1.3 mgd. The surplus in the wastewater collection system is not nearly as large as the surplus in the potable water system.

2.3.3 Electrical System

Keesler AFB purchases all of its electricity from Mississippi Power Company (MPCo), a Southern Company. The power is received from MPCo from their 115-kilovolt (kV) transmission line located to the south of the Keesler AFB-owned 115-kV substation (Keesler AFB 2004d). The Harrison Court family housing area is located directly east of the base. The 23-kV system serving the Harrison Court family housing area is fed and metered separately by MPCo. The small arms firing range is located northwest of the base. It is metered at secondary voltage and is served by Coast Electric Power Association.

Table 2-9
Wastewater Collection System Capability Summary

Category	Value	Percent of Permitted Capacity	Percent of Current Design Capacity	Headroom from Designed
Wastewater Collection System Capacity				
Contracted rate for West Biloxi Treatment Plant (mgd)	2.25	100	NA	NA
Lift Station Capacity (mgd)	3.24	NA	NA	NA
Contracted rate for Keegan Bayou Plant (mgd)	0.05	100	NA	NA
Wastewater Collection System Consumption				
Estimated 2003 Total Consumption (mgd)	2.17	96	67	1.07
Estimated 2004 Total Consumption (mgd)	1.95	87	60	1.29
Estimated 2003 Peak Flow (mgd)	2.55	NA	79	0.69
Estimated 2004 Peak Flow (mgd)	2.25	NA	69	0.99

Source: Appendix C, Keesler AFB 2004a, Keesler AFB 2004d, Keesler AFB 2006f, and Keesler AFB 2006g
Notes:
Contracted rates are restated in terms of a daily rate, which is not a daily limit. Contract rates are expressed in terms of annual sewer effluent flow. Harrison Court average daily sewage flows are included with the rest of the Base average daily sewage flow and compared to the West Biloxi contract rate. Actual Harrison Court sewer rates are approximately 20 to 40 percent on average greater than the contract stated amount based on reported monthly values between 2003 and 2005.
Percent of design capacity is expressed in terms of base lift station capacity, assuming all sewage is directed toward the West Biloxi Treatment Plant.

mgd million gallons per day
NA not applicable

2.3.3.1 Baseline Electrical System Conditions

Although supplied by a 115-kV substation, the nominal system voltage at the base is reported as 23-kV. There are 240 miles of electric lines. All feeder circuits are 600-ampere (A) class, and branch circuits are 200A class. The power is distributed by seven radial distribution feeders designed to provide normal and emergency service through the use of contingency feed points. A power factor correction system has been installed at the substation and is designed to maintain the power factor at 0.95 minimum. The base electrical system was refurbished in the early 1980s and again in 2001. Through an aggressive program, Keesler has removed all overhead power lines to an underground power distribution system (Keesler AFB 2004d). Special electrical needs on the base include 400-hertz (Hz) power (aircraft power) in various buildings in training and maintenance areas (Keesler AFB 2004a).

Records for electrical demand from Air Force Forms 3556 and billing records for FY2002 are provided below (Keesler AFB 2004d).

- Annual Usage 167,543,879 kilowatt-hours (KWh)
- Monthly Average Usage 13,961,990 KWh
- High Month Demand: August 2002 34,313 kilovolt-amperes (KVA)
- Low Month Demand: March 2002 20,032 KVA

Annual consumption data pulled from available Form 937 data from 2003 to 2005 indicate a 2003 and 2004 annual consumption of 154,588,406 KWh and 161,868,192 KWh, respectively. The corresponding peak load information estimated from the same monthly data for 2003 and 2004 were 26,991 KVA and 23,326 KVA, respectively.

2.3.3.2 Limiting Factors on Electrical System

Infrastructure is not a limiting factor for the electrical system. The nominal and contract supply rates are generally less than 20 percent of the actual substation or switch capacity. The actual consumption is generally less than 27 percent of the actual capacity. The peak loads are generally less than 47 percent of the supply capacity.

2.3.3.3 Maximum Electrical System Capability

Table 2-10 summarizes the electrical system capability, current consumption, and surplus capability. The contract and nominal rates should be re-evaluated, but the actual electrical system supply is not a limiting factor to growth at Keesler AFB. The available interior space could easily double based on the available electrical supply provided the general mix of added facilities is approximately the same in demand profile as the current facilities and appropriate distribution system upgrades are incorporated into the individual project plans.

2.3.4 Natural Gas Distribution System

2.3.4.1 Baseline Natural Gas Distribution System Conditions

Center Point Energy supplies natural gas to Keesler AFB. A single eight-inch pipeline runs from Gulfport, Mississippi twelve miles to the main base. Service is supplied to the base at a pressure of 135 pounds per square inch gauge (psig), and distributed to the base facilities at 25 psig. The gas main passes through two different measuring and regulator/valve stations on the west side of the City of Biloxi to enter Thrower Park family housing area and the main base. The majority of the twelve miles of eight-inch gas main is located on private property within a thirty-foot easement. The regulating station at Turkey Creek (Gulfport) is owned and maintained by the Air Force, as are the five additional metering and regulator stations (Keesler AFB 2004d).

Table 2-10
Electrical System Capability Summary

Category	Value	Percent of Nominal Capacity	Percent of Actual Capacity	Headroom from Actual
Electrical System Capacity				
Total Annual Capacity (MWh)	612,898	NA	100	NA
Nominal Annual Capacity (MWh)	117,986	100	19	NA
Total Peak Capacity (KVA)	73,648	NA	100	NA
Nominal Peak Capacity (KVA)	14,682	100	20	NA
Electrical System Consumption				
FY2002 Consumption (MWh)	167,544	142	27	445,354
FY2003 Consumption (MWh)	154,588	131	25	458,310
FY2004 Consumption (MWh)	161,868	137	26	451,030
Estimated FY2002 Peak Demand (KVA)	34,313	234	47	39,335
Estimated FY2003 Peak Demand (KVA)	26,991	184	37	46,657
Estimated FY2004 Peak Demand (KVA)	23,326	159	32	50,322

Source: Appendix C, Keesler AFB 2004d, and Keesler AFB 2006g

Notes:
Nominal capacity is the sum of the contract supply rates from the Harrison Court and Firing Range FY2002 contracts added to the nominal supply rating obtained from the main base system description in the FY2004 privatization contract bid request documentation. Actual capacity is the sum of the actual supply ratings obtained from the from the main Base system description in the FY2004 privatization contract bid request documentation.

A ampere
FY fiscal year
KW kilowatt
KWh kilowatt-hour
MW megawatt (equivalent to 1000 KW)
KVA kilovolt ampere (equivalent in units to a KW)
MWh megawatt-hour (equivalent to 1000 KWh - the product of the power rating, A rating, and voltage rating in MW)
NA not applicable

There are approximately 400,000 linear feet (or about 80 miles) of gas lines in the base distribution system. Over ninety-five percent of the base's gas mains are steel. In some areas where it was necessary to replace lines due to new construction or repair, polyethylene pipe has been installed in place of steel (less than 5 percent of base total). The average depth of burial for the entire system is 42 inches (Keesler AFB 2004d).

Records for gas usage from AF Form 3556 for FY 2002 are provided below:

- Annual Usage: 468,025 thousand cubic feet (Mcf)
- Monthly Average: Usage 39,002 Mcf
- Daily Average Usage: 1,282 Mcf

- High Month (January 2002): 59,384 Mcf
- Low Month (July 2002): 24,787 Mcf
- Average Flow Rate: 53,417 cubic feet per hour
- Estimated Peak Flow Rate: 126,666 cubic feet per hour

Annual consumption data pulled from available Form 937 data from FY2003 to FY2005 indicate a FY2003 and FY2004 annual consumption of 446,565 Mcf and 408,445 Mcf, respectively. The corresponding peak load information estimated from the same monthly data for 2003 and 2004 were both 1,862 Mcf per day (Mcf/d), which corresponds to an estimated hourly average rate of 78,583 cubic feet per hour (Keesler AFB 2006g).

2.3.2.4 Limiting Factors on Natural Gas Distribution System

Infrastructure is not a limiting factor for the natural gas distribution system. The contract limitations on the main base natural gas supply are 225 Mcf per hour, 5,400 Mcf/d, and 550,000 Mcf per year (Keesler AFB 2006g).

2.3.3.4 Natural Gas Distribution System Capability

Table 2-11 summarizes the natural gas distribution system capability, current consumption, and surplus capability.

Table 2-11
Natural Gas Distribution System Capability Summary

Category	Value	Percent of Supply	Headroom from Supply
Natural Gas System Supply			
Annual Supply (Mcf)	550,000	100	NA
Daily Contract Rate Cap (Mcf/d)	5,400	100	NA
Hourly Contract Rate Cap (Mcf/hr)	225.0	100	NA
Pipeline Capacity (Mcf/hr)	N/A	NA	NA
Natural Gas System Consumption			
FY2002 Annual (Mcf)	468,025	85	81,975
FY2003 Annual (Mcf)	446,565	81	103,435
FY2004 Annual (Mcf)	408,445	74	141,555
FY2002 Hourly Peak (Mcf/hr)	126.7	56	98.3

Source: Appendix C, Keesler AFB 2004d, and Keesler AFB 2006g

FY fiscal year
Mcf thousand cubic feet
Mcf/d thousand cubic feet per day
Mcf/hr thousand cubic feet per hour
N/A not available
NA not applicable

Chapter 3

Flying Mission Capability

CHAPTER 3

FLYING MISSION CAPABILITY

This section assesses Keesler AFB's flying mission capacity. The assessment will consider two factors: 1) noise levels in the immediate vicinity of the airfield and 2) the airfield's physical capacity to support increased operations (which considers Air Traffic Control procedures and requirements).

The assessment addressed two conditions: current operations (baseline) and increased operations (threshold, or maximum capability). First, existing operations at the base were defined and described in terms of both noise levels and airfield capacity. Then incremental increases of Keesler-based C-130J operations were modeled, while maintaining all other aircraft operations at a constant level. Each increase was then assessed against noise level and airfield capacity thresholds, described below, until one or both thresholds were met. The level of operations at the point at which one or both thresholds were met defined the Keesler AFB flying mission capability.

3.1 METHODOLOGY

3.1.1 Environmental Noise

Noise is considered to be unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. The word "metric" is used to describe a standard of measurement. As used in environmental noise analysis, there are many different types of noise metrics. Each has a different physical meaning or interpretation. The values depicted in these metrics incorporate a common factor. The frequency of sound is measured in cycles per second, or Hz. This measurement reflects the number of times per second the air vibrates from the acoustic energy. Low frequency sounds are heard as rumbles or roars, and high frequency sounds are heard as screeches. Sound measurement is further refined through the use of "A-weighting." The normal human ear can detect sounds that range in frequency from about 20 Hz to 15,000 Hz. However, all sounds throughout this range are not heard equally well. Therefore, through internal electronic circuitry, some sound meters are calibrated to emphasize frequencies in the 1,000 to 4,000 Hz range. The human ear is most sensitive to frequencies in this range, and sounds measured with these instruments are termed A-weighted, and are shown in terms of A-weighted decibels (dBA). The metric associated with this assessment is described below.

3.1.2 Day-Night Average Sound Level

This metric, identified as Day-Night Average Sound Level (L_{dn}), is the most commonly used. Normally, it is used to assess aircraft operations around an airport. It sums the individual noise events and averages the resulting level over a specified length of time. Thus, it is a composite metric representing the maximum noise levels, the duration of the events, the number of events that occur, and the time of day during which they occur. This metric adds 10 decibels (dB) to those events that occur between 10:00 P.M. and 7:00 A.M. to account for the increased intrusiveness of noise events that occur at night when ambient noise levels are normally lower than during the day time. This cumulative metric does not represent the variations in the sound level heard. Nevertheless, it does provide an excellent measure for comparing environmental noise exposures when there are multiple noise events to be considered.

Public annoyance is the most common concern associated with exposure to elevated noise levels. When subjected to L_{dn} levels of 65 dBA, approximately 12 percent of the persons so exposed will be "highly annoyed" by the noise. At levels below 55 dBA, the percentage of annoyance is significantly lower (less than three percent), and at levels above 70 dBA, it is significantly higher (greater than 25 percent) (Finegold et al 1994).

L_{dn} metrics are the preferred noise metrics of the Department of Housing and Urban Development, the Department of Transportation, the Federal Aviation Administration (FAA), the USEPA, and the VA. While L_{dn} does provide a single measure of overall noise impact, it is fully recognized that it does not provide specific information on the number of noise events or the specific individual sound levels that do occur. For example, an L_{dn} of 65 dB could result from a very few noisy events, or a large number of quieter events. Although it does not represent the sound level heard at any one particular time, it does represent the total sound exposure. Scientific studies and social surveys have found the L_{dn} to be the best measure to assess levels of community annoyance associated with all types of environmental noise. Therefore, its use is endorsed by the scientific community and governmental agencies (American National Standards Institute 1980, 1988; USEPA 1974; Federal Interagency Committee on Urban Noise [FICUN] 1980; Federal Interagency Committee on Noise [FICON] 1992).

Finally, it should be noted that ambient background noise is not considered in the aircraft noise calculations that are presented below. There are two reasons for this. First, ambient background noise, even in wilderness areas, varies widely, depending on location and other conditions. For example, studies conducted in an open pine forest in the Sierra National Forest in California have measured up to a 10 dBA variance in sound levels simply due to an increase in wind velocity (Harrison 1973). Therefore, assigning a value to background noise would be arbitrary. Secondly, and probably most important, is that it is reasonable to assume that ambient background noise in the project's radius of influence would have little or no effect on the calculated L_{dn}. In calculating noise levels, louder sounds dominate the calculations, and overall, aircraft noise would be expected to be the dominant noise source characterizing the acoustic conditions in the region.

Using measured sound levels as a basis, the Air Force developed several computer programs to calculate noise levels resulting from aircraft operations. Sound levels calculated by these programs have been extensively validated against measured data, and have been proven to be highly accurate.

3.1.3 Airfield Noise

The following terms are defined to provide a better understanding of how data are developed for input to the noise models used to calculate noise. Around an airfield, aircraft operations are categorized as takeoffs, landings, or closed patterns (which could include activities referred to as touch-and-gos or low approaches). Each takeoff or landing constitutes one operation. A closed pattern occurs when the pilot of the aircraft approaches the runway as though planning to land, but then applies power to the aircraft and continues to fly as though taking off again. The pilot then flies a circular or rectangular track around the airfield, and again approaches for landing. In some cases, the pilot may actually land on the runway before applying power, or in other cases, the pilot simply approaches very close to the ground. In either event, since a closed pattern operation essentially consists of a landing and a takeoff, it is considered two operations.

3.2 AVIATION RESOURCES

3.2.1 Current Aircraft Operations

Under baseline conditions, Keesler AFB supports approximately 36,400 annual aviation operations. Based on the Air Force standard of 260 flying days per year, this equates to approximately 146 daily operations. Considering all types of flight activities, a scenario representing an “average day’s” operations was developed for the type of aircraft being analyzed. The operations considered include arrivals (landings), departures (takeoffs), and closed patterns. Noise calculations consider the frequency of flight operations, runway utilization, and the flight tracks and flight profiles flown by each aircraft.

These levels and types of activity are then combined with information on climatology, maintenance activities, and aircraft flight parameters, and processed through the Air Force's BASEOPS/NOISEMAP (Moulton 1990) computer models to calculate L_{dn}. Once noise levels are calculated, they are plotted on a background map in 5-dB increments from 65 dBA to 85 dBA, as applicable. Noise contours associated with baseline activities at Keesler AFB are shown in Figure 3-1. The land areas (in acres) encompassed by each contour are shown in Table 3-1.

Table 3-1
Land Areas Exposed to Elevated Noise Levels (Baseline Conditions)

Noise Level (L_{dn})	Land Area (in Acres)[1]
65 – 70	383.3
70 – 75	189.6
75 – 80	91.4
80 – 85	1.4
> 85	0

Source: Wasmer and Mausell 2002
Notes:
[1]Area shown is for applicable noise levels. Total land area exposed to L_{dn} 65 or greater is 665.7 acres.
L_{dn} Day-Night Average Sound Level

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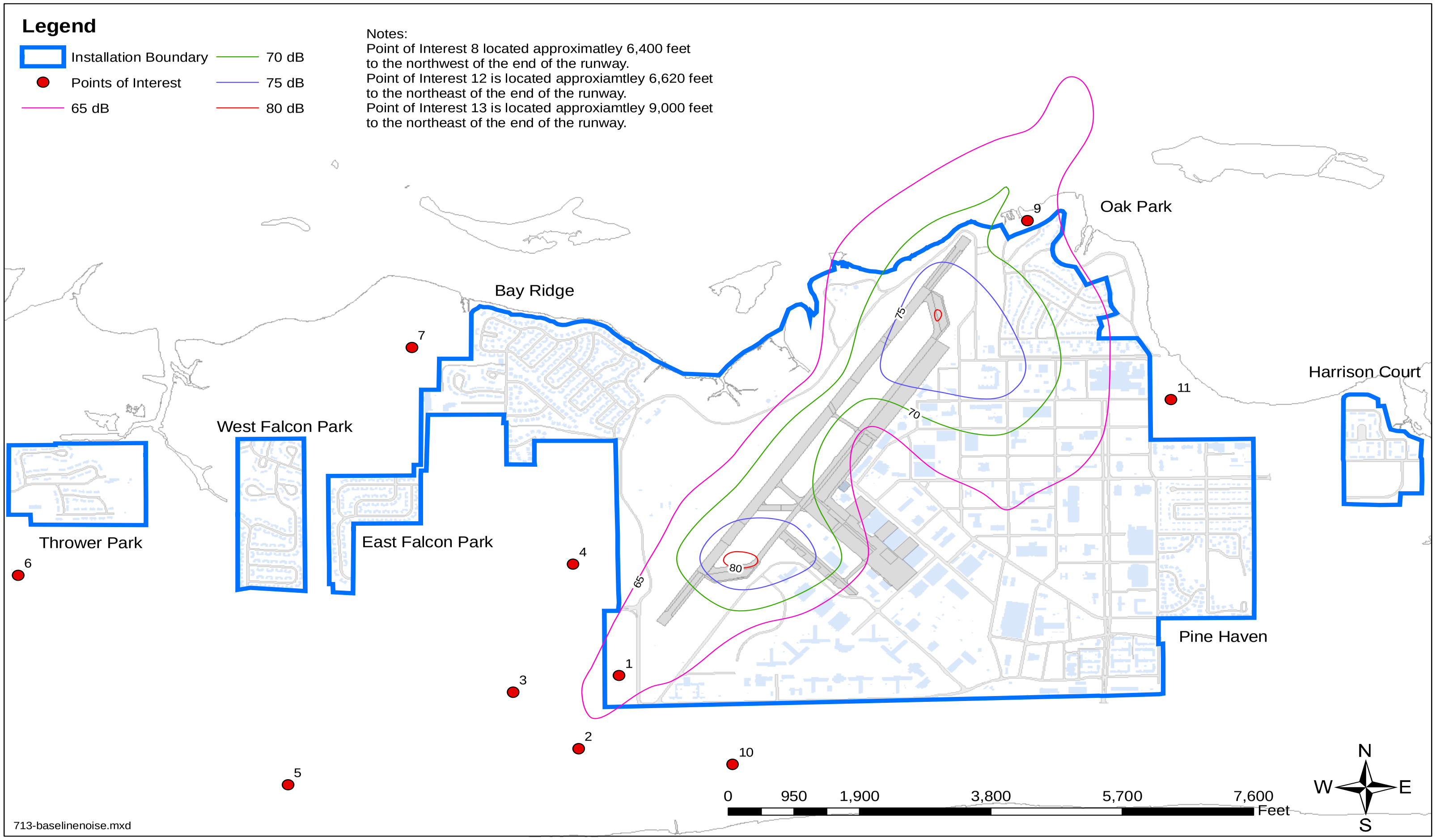

Figure 3-1 Baseline Noise Contours

In order to further assess noise exposure from aviation activity, 13 locations around the base were selected for specific analysis. These points represent land uses that could be potentially sensitive to elevated noise levels. Figure 3-1 reflected these points, and Table 3-2 defines the points and shows noise exposure under baseline conditions.

Table 3-2
Noise Exposure at Sensitive Receptors (Current Conditions)

Point Identification	Location/Sensitive Receptor	Noise Level (L_{dn})
1	Point 1,100 feet southwest of Runway 21 (residential)	68.1
2	Point 2,400 feet southwest of Runway 21 (residential)	65.3
3	Point west-southwest of Runway 21 (residential)	58.4
4	Jeff Davis Elementary School	56.9
5	Point southwest of Runway 21 (residential)	50.3
6	Our Lady of Fatima Church/School	48.6
7	Biloxi National Cemetery	48.0
8	Point north of Runway 03 (residential)	51.1
9	Point northeast of Runway 03 (residential)	66.6
10	West End Elementary School	55.0
11	Biloxi Regional Medical Center	60.7
12	D'Iberville Elementary School	51.8
13	D'Iberville Middle School	49.4

Source: NOISEMAP (Moulton 1990)

L_{dn} Day-Night Average Sound Level

3.3 AVIATION RESOURCES CAPACITY

3.3.1 Aircraft Operations

In order to assess the potential for the expansion of operations at Keesler AFB, C-130J flight operations were incrementally increased, and the changed noise levels were evaluated at the 13 specific points. Two criteria were applied, as specified in the land use planning guidelines established by Federal Interagency Committees and typically used to identify significant changes in noise exposure (14 Code of Federal Regulations, Part 150, § 150.21d(1)):

- Capacity would be reached when a previously compatible land use became incompatible.
- Capacity would be reached when noise levels measured at sensitive receptors already within incompatible areas increased by more than 1.5 dB.

These criteria were met when levels of C-130J operations were increased by 60 percent. This increase equates to performing approximately 42,000 annual or 168 daily operations at the installation. The noise contours associated with these increased activity levels are shown in Figure 3-2, and the land areas exposed to elevated noise levels are compared with current conditions in Table 3-3. The changes to noise exposure at the specific points are identified in Table 3-4.

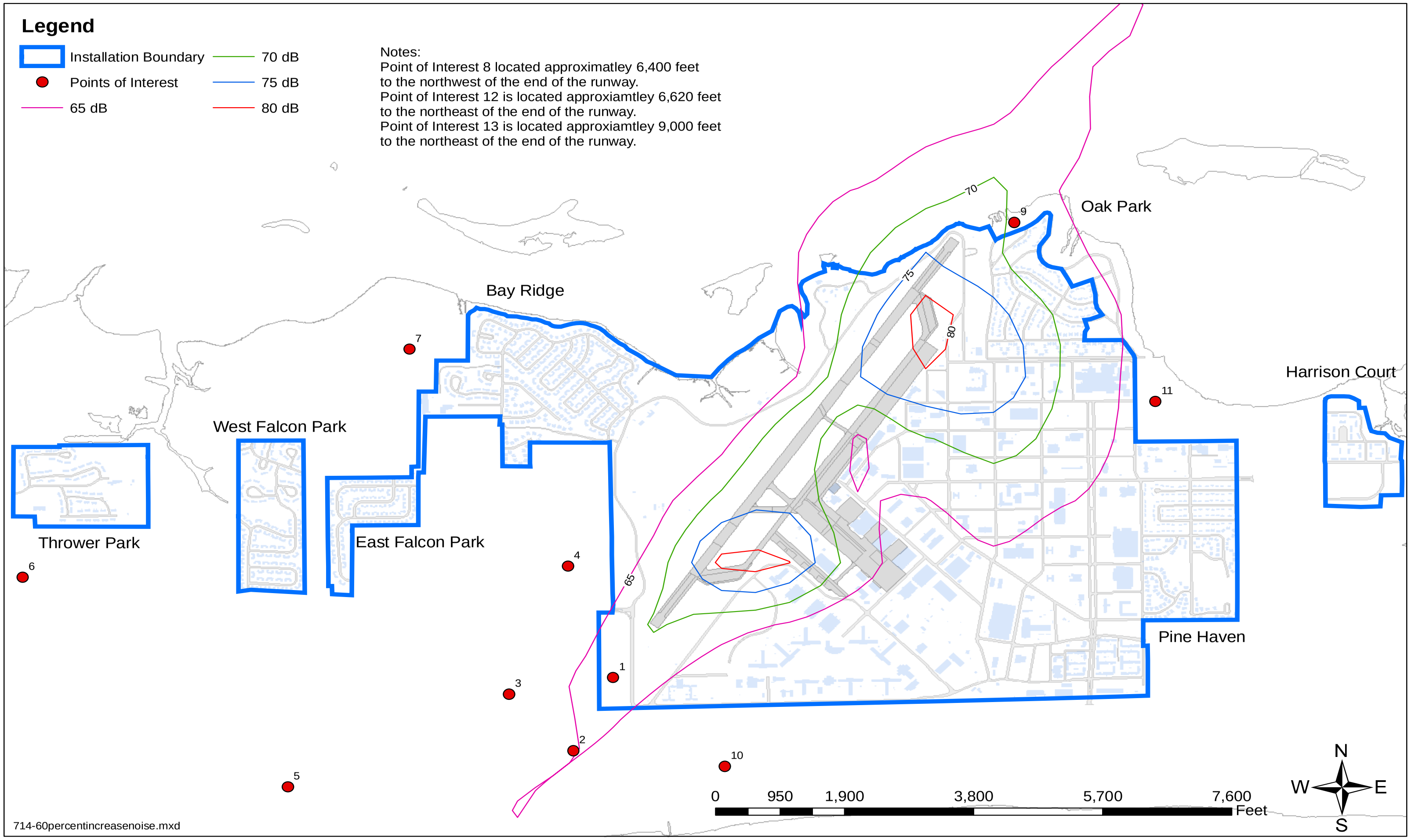

Figure 3-2 Noise Contours with 60 Percent Increase in C-130J Operations

Table 3-3
Land Areas Exposed to Elevated Noise Levels
(60 Percent Increase in C-130J Operations)

Noise Level (L_{dn})	Land Area, in Acres, Exposed to Elevated Noise[1]			
	Current Operations	Expanded Operations	Change (Acres)	Percent Change
65 – 70	383.3	503.2	+120.0	+31
70 – 75	189.6	236.1	+46.5	+25
75 – 80	91.4	118.6	+27.2	+30
80 – 85	1.4	11.7	+10.3	+736
> 85	0	0	0	N/A

Source: Wasmer and Mausell 2002

Notes:
[1]Area shown is for applicable noise levels. Total land area exposed to L_{dn} 65 or greater increases from 665.7 acres to 869.7 acres, an approximate 31 percent increase.

L_{dn} Day-Night Average Sound Level

Table 3-4
Noise Exposure at Sensitive Receptors
(60 Percent Increase in C-130J Operations)

Point Identification	Location	Noise Level (L_{dn})		
		Current	Capacity	Change
1	Point 1,100 feet southwest of Runway 21 (residential)	68.1	69.0	+0.9
2	Point 2,400 feet southwest of Runway 21 (residential)	65.3	66.2	+0.9
3	Point west-southwest of Runway 21 (residential)	58.4	59.1	+0.7
4	Jeff Davis Elementary School	56.9	57.5	+0.6
5	Point southwest of Runway 21 (residential)	50.3	51.0	+0.7
6	Our Lady of Fatima Church/School	48.6	48.9	+0.3
7	Biloxi National Cemetery	48.0	48.7	+0.7
8	Point north of Runway 03 (residential)	51.1	52.6	+1.5
9	Point northeast of Runway 03 (residential)	66.6	68.1	+1.5
10	West End Elementary School	55.0	55.8	+0.8
11	Biloxi Regional Medical Center	60.7	62.6	+1.9
12	D'Iberville Elementary School	51.8	53.1	+1.3
13	D'Iberville Middle School	49.4	50.3	+0.9

Source: NOISEMAP (Moulton 1990)

L_{dn} Day-Night Average Sound Level

As indicated in Table 3-4, capacity was reached at Point 9 since an already-incompatible condition was exacerbated by an increase of 1.5 dBA. The land uses at points 8 and 11 were, and remained compatible. The 1.5 dB increase only applies to land uses that were already incompatible. The operations associated with this 60 percent increase in C-130J operations will form the basis for the quantitative assessments of the physical resources at the airfield.

3.3.2 Airfield Capacity

Aviation facilities at Keesler AFB include one Class B runway, taxiways, parking ramp areas, and associated land-side facilities. The runway, 03/21, is 7,630 feet long by 150 feet wide. Runway 03 has a 1,598-foot displaced threshold; Runway 21 has a 1,000-foot displaced threshold. Controlled airspace has been established in the region to manage air traffic.

The capacity of an airfield is described by its throughput rate. Throughput rate is the maximum number of operations that can take place within a given time period. Operations considered include arrivals, departures, and closed patterns.

Many factors determine an airfield's capacity (e.g., the number and types of runways, availability of taxiways, the availability and capability of land-side support facilities to cycle aircraft, and the numbers and types of aircraft operating at the facility). In order to assess these factors, the FAA has developed several models. These are used in the civilian sector for airport planning. However, they are also often used by the military in preparing planning data.

For this document, runway capacity is assessed using guidance in FAA Advisory Circular (AC) 150/5060-5, *Airport Capacity and Delay*. Two different methods were employed; the first is applicable to long-term planning and is somewhat generalized, the second is more detailed and specific, and focused on the capacity of Keesler AFB's runway.

Long Term Planning

The assessment for long-term planning considers the mix of aircraft classes, and the ratio of aircraft in each class operating from the airfield. Aircraft are classified by their maximum takeoff weight and the number of engines. This calculated "mix-index" is then applied to standard nominal values developed for the applicable runway configuration, which for Keesler AFB, is a single runway. Output from this assessment provides annual service volume (capacity) per year, and the number of operations per hour that can be conducted under Visual Meteorological Conditions (VMC) and Instrument Meteorological Conditions (IMC). These factors can then be compared with expected demand to assess the "capacity consumed" by a given level of operations. Table 3-5 summarizes the assessment for annual conditions, and Table 3-6 shows similar data for operations per hour that could be conducted under VMC or IMC conditions. It should be noted that data in Table 3-6 reflect a range of values. VMC and IMC would be mixed; neither would exist all of the time. Therefore, capacity would fall between the two values.

Table 3-5
Comparison of Airfield Operations for Baseline and 60 Percent Increase in C-130J Operations: Annual Capacity versus Annual Demand

Keesler AFB Operations	Annual Service Volume[1] (capacity)	Annual Demand	Capacity Used/ Remaining (percent)
Current	230,000	36,400[2]	16/84
60 Percent Increase	230,000	42,000[3]	18/82

Notes:
[1]FAA 1983
[2]Keesler AFB 2005
[3]Reflects 60 percent increase in based C-130J operations only (versus demand).

AFB Air Force Base
FAA Federal Aviation Administration

Table 3-6
Comparison of Airfield Operation for Baseline Conditions and 60 Percent Increase in C-130J Operations under Varying Weather Conditions

Keesler AFB Operations	Operations Hourly Capacity[1]	Operations Hourly Expected	Capacity Used/ Remaining (percent)
VMC Conditions			
Current	98	9[2]	9/91
60 Percent Increase	98	10.5[3]	11/89
IMC Conditions			
Current	59	9[2]	15/85
60 Percent Increase	59	10.5[3]	18/82

Notes:
[1]FAA 1983
[2]Keesler AFB 2005
[3]Reflects 60 percent increase in based C-130J operations only (versus demand).

AFB Air Force Base
FAA Federal Aviation Administration
IMC Instrument Meteorological Conditions
VMC Visual Meteorological Conditions

As illustrated above in Table 3-6, application of the FAA's long-range planning methodology indicates sufficient capacity for potential expansion of operations at the airfield. However, as previously stated, these assessments use nominal values for the many factors that influence an airfield's capacity. Many of these factors involve land-side supporting facilities dealing with the handling and processing of aircraft and deplaning/emplaning of passengers at a civil facility. These considerations are not applicable for Keesler AFB. However, the runway component of the assessment is applicable.

3.3.3 Runway Capacity

The FAA guidance in AC 150/5060-5 provides methodology to specifically model the throughput capacity for the runway. However, more specific data pertaining to specific types of operations and availability of taxiways is used than for the long-range planning addressed above.

Table 3-7 shows the modeled hourly capacity of Keesler AFB's runway under IMC and VMC. This capacity is then assessed in relation to the estimated demand that would exist after the increase in based C-130J operations.

Table 3-7
Estimated Runway Capacity after 60 Percent Increase in C-130J Operations

Weather Condition	Hourly Capacity[1]	Hourly Demand[2]	Capacity Used/ Remaining (percent)
VMC	68	10.5	15/85
IMC	45	10.5	23/77

Notes:
[1]FAA 1983
[2]Keesler AFB 2005 (Current operations with 60 percent increase in based C-130J operations only.)

AFB Air Force Base
FAA Federal Aviation Administration
IMC Instrument Meteorological Conditions
VMC Visual Meteorological Conditions

As indicated in Table 3-7, after the increase in operations, even if all of the average planned operations are conducted under the most demanding conditions (IMC), the airfield still has unused capacity. However, it should be noted that the calculated capacity consumed is conservative. Under severe IMC conditions, some operations would be cancelled or curtailed. Thus, the runway's capacity would not necessarily be stressed at the indicated levels.

3.3.4 Military Training Airspace

Keesler AFB-based aircraft make use of the regional military training airspace (Military Operations Areas, Military Training Routes, and Restricted Areas). Currently, there is no indication that the use of these airspace elements is at or approaching saturation. The relatively minor increase in operations associated with this assessment would not be expected to adversely impact the availability of this airspace or hinder the ability of aircrews to meet all training requirements.

3.3.5 Flying Mission Capability

The capability of Keesler AFB-based aircraft to increase operations was assessed based on aircraft noise, airfield, and airspace capacity to support additional operations. These assessments show that C-130J aircraft operations could be increased by up to 60 percent, without creating a major impact.

The controlling limiting factor is noise. As discussed in Section 3.3.1, at an increase of 60 percent in C-130J operations, one of the stipulated noise thresholds was reached. When these levels of operations were assessed against airfield, runway, and airspace capacities, they were found to be well below any limiting level, with low capacity consumed (Sections 3.3.2, 3.3.3, and 3.3.4).

Chapter 4

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CHAPTER 4

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Chapter 5

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Appendix A

Population Summary Data

APPENDIX A

POPULATION SUMMARY DATA

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Table A-1 presents population information obtained directly from the fiscal year (FY) 2004 Economic Impact Analysis (EIA).

Table A-1
Base-Year Population Data
Extracted from Fiscal Year 2004 Economic Impact Analysis

Item	Population
Military/Student Personnel On-base	3,528
Military/Student Personnel Off-base	7,130
ADSL	4,476
Family Members (Dependents)	7,034
Civilian Personnel	3,849
Source: Keesler AFB 2004b and Keesler AFB 2006c	

Table A-2 presents population on- to off-base breakdown information estimated from the FY2004 EIA presented in Table A-1 and assumptions confirmed through interviews with the 81st TRW Public Affairs office personnel (Keesler AFB 2006c). Off-base dependents are distinguished from on-base dependents by applying the same ratios obtained from on-base military/student personnel (33 percent) and off-base military/student personnel (67 percent) to the associated family members (dependents). This distinction allows for off-base dependents to be excluded from the evaluations of current and future impact on base resources by the base population.

Table A-2
Base-Year Population Data
Breakdown of On-base to Off-base Population
Estimated from Fiscal Year 2004 Economic Impact Analysis

Item	Total	On-base	Off-base	Notes
Military Personnel On-base to Off-base Ratios	100%	33%	67%	Based on total of 10,658 military/student personnel and breakdown in on- and off-base from Economic Impact Analysis.
Military Personnel	6,182	2,046	4,136	Military Personnel = Military/Students – Average Daily Student Load. On-base and off-base estimated from ratios calculated from the Economic Impact Statement.
Dependents	7,034	2,328	4,706	Applying on- to off-base ratios to family members (dependents) obtained from Economic Impact Statement.
Civilian Personnel	3,849	0	3,849	Assumes all civilians working on base live off base.
Average Daily Student Load	4,476	4,476	0	Assumes all students live on base.
Source: Keesler AFB 2004b and Keesler AFB 2006c				

Table A-3 presents transient population (base overnight visitors) breakdown information estimated from FY2004 occupancy rates (AETC 2006b), building room (bed) capacity data obtained from real property data (Keesler AFB 2006b), and assumptions confirmed through interviews with the 81st TRW Public Affairs office personnel (Keesler AFB 2006c).

Table A-3
Base-Year Transient Population Data
Estimated from Fiscal Year 2004 Keesler AFB Occupancy Rates

Lodging Quarters (Fiscal Year 2004 Occupancy)	Bed Capacity	Average Daily Occupancy
Visiting Officers' Quarters (77 percent)	336	259
Visiting Airmen's Quarters (74 percent)	836	619
Visiting Quarters (92 percent)	480	442
Transient Lodging Facility (94 percent)	50	47
Total Transient Population FY2004	1,702	1,366
Source: Keesler AFB 2006b, Keesler AFB 2006c, AETC 2006b		

Table A-4 summarizes base population data presented in Tables A-1, A-2, and A-3, presents total and effective service population data estimated from assumptions confirmed through interviews with the 81st TRW Public Affairs office personnel (Keesler AFB 2006c). Effective service population data is estimated to account for reduced consumption associated with 8-hour personnel when compared to 24-hour residents and visitors. The 8-hour population is represented as a 24-hour equivalent population by dividing the total 8-hour population value by three. The resulting 24-hour equivalent population is used to evaluate current and future demand on base resources, such as the potable water and sewer systems. These population estimates do not include off-base dependents nor do they include retired veterans associated with the base since these subpopulations presented in the FY 2004 EIA do not impose a significant demand on base resources.

Table A-4
Base-Year Total and Effective Populations

	Total	On-base	Off-base	Effective Service Population
Total Base Population (excludes off-base dependents)	18,201	10,216	7,985	12,878
8-Hour (off-base personnel)	7,985	0	7,985	2,662
24-Hour (on-base personnel, students, dependents, transients)	10,216	10,216	0	10,217

Source: Tables A-1, A-2 and A-3

Note: Effective population is estimated as 33.33 percent of the off-base military and civilian personnel populations and 100 percent of the on-base population.

Tables A-5 and A-6 presents and analysis of the population supported by available on-base housing associated with the 2004 base year (pre-Hurricane Katrina), current state as of April 2006 (post-Hurricane Katrina), the planned end state resulting from implementation of the Hurricane Katrina Recovery Projects and current list of Capital Improvements projects (Keesler AFB 2004a, Keesler AFB 2006a), and the currently estimated maximum on-base housing capability.

Table A-5
On-base Housing Capability Analysis

Accommodations	Personnel	Dependents	Total On-base	Notes
Multiple Family Housing				
Pre-Katrina	1,820	6,825	8,645	Based on estimated average of 3.75 rooms per housing unit and 1 dependent per room from Housing EA distribution of 2-, 3-, and 4-bedroom units (Keesler 2006d).
Post-Katrina	865	3,244	4,109	Based on estimated average of 3.75 rooms per housing unit and 1 dependent per room from Housing EA distribution of 2-, 3-, and 4-bedroom units (Keesler 2006d).
Planned End State	1,067	3,506	4,573	Based on planned 762 3-bedroom and 305 4-bedroom units from Housing EA (Keesler 2006d)
Capability	1,067	3,506	4,573	No changes from planned based on elimination of Oak Park, North and South Pine Haven, and North Hanson as MFH areas (Keesler 2006e).
Student Non-prior Service Dormitories				
Current State	3,678	0	3,678	Based on Real Property data obtained from ACES by Keesler CES staff (Keesler 2006b, 2006e).
Planned End State	4,198	0	4,198	Based on planned demolition of Building 7502 (480-student dormitory) and construction of Dorms 9 (500-student dormitory) and 10 (500-student dormitory) from CIP Projects 023003B and 023003 (Keesler 2004a, 2006a, 2006e)
Capability	8,998	0	8,998	Based on unplanned conversion of portions of the former Oak Park housing area into three (3) 1600-person dormitories, just east of the 3000-foot clear zone, and buffered from the airfield.

Table A-5
On-base Housing Capability Analysis (cont.)

Accommodations	Personnel	Dependents	Total On-base	Notes
Permanent Party Dormitories				
Current State	1,414	0	1,414	Based on Current USAF Form 7115 Data obtained from ACES by Keesler Real Property (Keesler 2006b).
Planned End State	672	0	672	Based on planned out year demolition of all current 1414 PP Dormitory units and rebuilding of 672 units on base in accordance with the current CIP projects MAHG 043000, 103000, 123000, 143000, 153000 associated with the Permanent Party Dormitories' Area Development Plan and the Industrial Area Development Plan (Keesler 2004a, 2006a, 2006e).
Capability	1,244	0	1,200	Based on planned out year demolition of all current 1414 PP Dormitory units, rebuilding of 144 units on base in accordance with the current CIP project MAHG 043000 associated with the Permanent Party Dormitories' Area Development Plan and the Industrial Area Development Plan, and redesigning the four facilities associated with out year projects MAHG 103000, 123000, 143000, and 153000 to incorporate double the current planned occupancy (resulting in 528 additional units over planned) (Keesler 2004a, 2006a, 2006e).
Transient Dormitories				
Visiting Officers' Quarters (VOQ)	336	0	336	No planned changes
Visiting Airmen Quarters (VAQ)	836	0	836	No planned changes
Visiting Quarters (VQ) Current State	480	0	480	
Visiting Quarters (VQ) Planned End State	800	0	800	Addition of 320 units at Muse Manor
Transient Lodging Facility (TLF)	50	0	50	No planned changes

NPS Non-prior service personnel, or technical training students
PP permanent party personnel
CIP Capitol Improvements Plan

Table A-6
Summary of Housing Capability Analysis and Population Supported

Housing State and Capability	Total	Effective*	On-base	Off-base
Initial State Summary	27,505	19,461	15,439	12,066
Current State Summary	19,424	1,3743	10,903	8,521
Planned End State (2004 Capital Improvement Plan and Katrina Projects)	20,425	14,452	11,465	8,960
Capability (includes unscheduled structures)	29,917	21,168	16,793	13,124
Base-Year Service Population from Table A-4	18,201	12,878	10,216	7,985

Source: Tables A-4 and A-5
Notes:
Effective population is estimated as the sum of one third of the off-base population and the on-base population and is used in analysis of current and projected demand on base resources.
Off-base population is estimated from the product of the on-base population summarized from Table A-5 and the ratio of on- to off-base housing presented in Table A-4.

Based on the information presented in Tables A-4 and A-6, the base year 2004 total and effective populations were each approximately 61% of the estimated sustainable population capability based on on-base housing potential and 2004 base year ratios in on- to off-base service population estimates. The on-base housing analysis suggests that an approximate factor of 1.65 increases in effective service population is possible at Keesler AFB provided other base resources can accommodate the higher demand. Table A-7 presents the estimated breakdown in additional population potentially supported by the base, which totals to 11,715 additional people comprised of 5,360 military and civilian personnel, 1,178 on-base dependents, 4,522 students, and 656 visitors.

Table A-7
Comparison of Projected Population Capability to 2004 Base-Year Population Data

	2004 Base-Year		Estimated Capability		Additional Population Potentially Supported	
Population Entity	**Total Population**	**Effective Population**	**Total Population**	**Effective Population**	**Total Population**	**Effective Population**
Military Personnel On-base	2,046	2,046	2,267	2,267	221	221
Military and Civilian Personnel Off-base	7,985	2,662	13,124	4,375	5,139	1,713
Dependents On-base	2,328	2,328	3506	3,506	1,178	1,178
ADSL	4,476	4,476	8,998	8,998	4,522	4,522
Transient Population	1,366	1,366	2,022	2,022	656	656
Total	18,201	12,878	29,917	21,168	11,715	8,289

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Appendix B

Land Use Factors and Calculations

APPENDIX B

LAND USE FACTORS AND CALCULATIONS

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Land Use Density Formula, Tables, and Calculations

Information on the existing land use categories on Keesler Air Force Base (AFB) was provided by representatives from 81st Civil Engineering Squadron. The additional information required to define the existing and future land use plans for Keesler AFB was extracted from Keesler AFB *General Plan* and incorporated into this effort (Keesler AFB 2004a).

For non-flying missions where open space was available, potential development areas were identified and evaluated using a Geographic Information System overlay analysis. Table B-1 identifies the potential developable parcels for Keesler AFB. Each parcel was evaluated to determine if the area was available or appropriate for development. Areas possessing physical or operational constraints were eliminated from further consideration in the evaluation. The *General Plan* was used to define future land use and development constraints along with input from representatives of the 81st Civil Engineering Squadron (Keesler AFB 2004a).

In order to determine utility consumption estimates for evaluating constraints, population and interior building space was calculated by applying previously developed land use density factors to the identified developable parcels. The parcel density factor for impervious cover (Table B-2) and the authorized number of floors established by local development practices were used along with authorized per capita space (Table B-3) established in Air Force Handbook (AFH) 32-1084 (United States Air Force [USAF] 1994) to determine the capability of the parcel to manage additional facilities and population. Based on the authorized number of floors established for the base, an increased building density factor was applied to increase the total height of the buildings, and therefore, increase the interior building capacity of the base. Table B-4 provides the current interior building space by land use for the base.

Table B-5 presents the data used in the calculations presented below. The following equations are used to calculate the estimated additional population, increased interior building space, and future pavements for developable parcels available:

Population Equation:

$$P_I = \frac{\frac{IB_I}{d}}{\sum IB_I} \times \left(\sum IB_I - D \right)$$

Where:

P_I = Net Increase in Population

IB_I = Increased Density Building Interior Area (square feet)

d = Density of occupancy in square foot per person (square feet/person) - (factors obtained from AFH 32-1084)

D = Sum of Total Associated Demolition (square feet)

Total Increased Building Interior Area Equation:

$$IB_I = A \times I_s \times B_I \times 43560$$

Where:

IB_I = Increased Density Building Interior Area (square feet)

A = Parcel size (acres)

I_s = Increased building density factor

B_I = Interior building area factor

Interior Building Space Factor Equation:

$$B_I = \frac{B_{Is}}{T_A}$$

Where:

B_I = Interior building area factor

B_{Is} = Building interior space (acres)

T_A = Total developable (acres)

Future Building Area Footprint Equation:

$$F_{BF} = \frac{I_{BI}}{I_s}$$

Where:

F_{BF} = Future building footprint (square feet)

IB_I = Increased Density Building Interior Area (square feet)

I_s = Increased building density factor

Future Impervious Capacity Equation:

$$F_{IP} = A \times I_c \times 43560$$

Where:

F_{IP} = Future impervious capacity (square feet)

A = Parcel size (acres)

I_c = Impervious cover factor (defined by local practices)

Future Pavements Equation:

$$F_P = \frac{(F_{IP} - F_{BF})}{43560}$$

Where:

F_P = Future pavements (acres)

F_{IP} = Future impervious capacity (square feet)

F_{BF} = Future building footprint (square feet)

Table B-1
Potentially Developable Parcels

Parcel Number	Rationale for Development	Constraint	Developable	Acres
1	Running track	3,000-foot clear zone	No	13.78
2	Housing reconstructed in another location	--	Yes	10.21
3	Housing reconstructed in another location	--	Yes	6
4	Open area	--	Yes	5.76
5	Park	--	Yes	6.32
6	Open area	--	Yes	4.93
7	Building over 67 years in age	--	Yes	1.82
8	Open Area	--	Yes	2.04
9	Project Location (Military Working Dogs)	--	Yes	0.99
10	Project Location (Child Center Addition)	--	Yes	0.92
11	Open area	less than one acre	No	1.2
12	Project Location (Medical Staging)	--	Yes	2.93
13	Open area	--	Yes	1.23
14	Building over 67 years in age	--	Yes	5.55
15	Project Location (Warehouse) and building age	--	Yes	1.45
16	Building over 67 years in age	--	Yes	1.53
17	Building over 67 years in age	in floodplain	No	1.31
18	Building over 67 years in age	--	Yes	0.71
19	Building over 67 years in age	less than one acre	No	3.58
20	Project Location (Education Center)	--	Yes	5.75
21	Project Location (Headquarters Facility)	--	Yes	3.81
22	Building over 67 years in age	--	Yes	2.81
23	Project Location (Training Facility Phase 4)	--	Yes	1.15
24	Open area	--	Yes	1.74
25	Open area	--	Yes	1.63
26	Open area	--	Yes	7.71
27	Relocation of Dormitories	--	Yes	11.17
28	Relocation of Dormitories	--	Yes	12.37
29	Proposed permanent party dormitories	--	Yes	27.45

Note:
Each parcel number corresponds to a parcel identified on Figure 2-3.

Table B-2
Land Use Capability Facility Density Factors

Land Use Type	Percent Impervious Cover[1] "I_c"
Airfield Operation and Maintenance	30%
Administrative	53%
Airfield	2%
Airfield Pavements	100%
Community Commercial	69%
Community Service	46%
Housing Accompanied	34%
Housing Unaccompanied	58%
Industrial	55%
Medical	65%
Open Space	17%
Outdoor Recreation	10%
Technical Training	69%

[1]Land use density factors verified against *The General Plan* (USAF 2004).
I_c = density of parcel coverage by facility footprint and parking

% percent
USAF United States Air Force

Table B-3
Space Authorizations by Land Use

Land Use	Authorized Space[1] (square feet/person) "d"
Airfield Operation and Maintenance	500
Administrative	180
Airfield[2]	NA
Airfield Pavements[2]	NA
Community - Commercial	1000
Community - Services	500
Housing - Accompanied	450
Housing – Unaccompanied – Student Dormitories	264
Housing – Unaccompanied – Permanent Party Dormitories	475
Industrial	750
Medical	500
Open Space[2]	NA
Outdoor Recreation[2]	NA
Technical Training	100

[1]Data obtained from AFH-1084 (USAF 1994).
[2]No personnel would be assigned to these land uses.
d = density of occupancy

AFH Air Force Handbook
NA not applicable
USAF United States Air Force

Table B-4
Current Interior Building Space by Land Use

Land Type	Building Interior (square feet)	Building Interior B_{Is} (acres)
Airfield Operation and Maintenance	586,680	13.5
Administrative	425,071	9.8
Airfield	NA	NA
Airfield Pavements	NA	NA
Community Commercial	650,621	14.9
Community Service	62,999	1.4
Housing Accompanied	4,175,312	95.9
Housing Unaccompanied	NA	NA
Student Dormitories[1]	1,499,378	34.4
Permanent Party Dormitories[1]	1,499,378	34.4
Industrial	923,953	21.2
Medical	94,284	2.2
Open Space	30,222	0.7
Outdoor Recreation	1,827,667	42.0
Technical Training	795,968	18.3
Total	12,571,532	289

NA not applicable

[1]50 percent of total housing unaccompanied.

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Table B-5
Design Factors and Calculations

Land Type	Developable (acres)	Impervious Cover (percent)	Available Land Use (acres)	Authorized Space (square feet/person)	Building Floors (stories)	Increased Building Density Factor	Increased Building Density (stories)	Building Interior (square feet)	Building Interior (acres)	Interior Building Space Factor	Increased Building Interior (acres)	Increased Building Interior (square feet)	Future Building Footprint (square feet)	Future Impervious Capacity (square feet)	Future Pavements (square feet)	Future Pavements (acres)	Number of People (people)	Net Increase of People (people)
Variable	A	Ic		d			Is		BIs	BI		IBI	FBF	FIP		FP	P	PI
Airfield Operation and Maintenance	1.20	45%	0.54	500	1.0	1.0	1	586,680	13.5	0.4479	0.537	23,412	23,412.20	15,497	76	0.00	47	32
Administrative	6.46	51%	3.31	180	3.0	2.0	6	425,071	9.8	0.1346	1.740	75,777	12,629.53	144,123	91,190	2.09	421	292
Airfield	0	2%	0.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Airfield Pavements	0.00	100%	0.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Community Commercial	0.95	65%	0.62	1000	1.0	2.0	2	650,621	14.9	0.5107	0.970	42,270	21,134.88	26,928	4,018	0.09	42	29
Community Service	0.99	46%	0.46	500	1.5	2.0	3	62,999	1.4	0.0036	0.007	311	103.82	19,876	13,712	0.31	1	0
Housing Accompanied	0.00	34%	0.00	450	1.0	2.0	2	4,175,312	95.9	0.7605	0.000	0	0.00	0.00	0	0.00	0	0
Housing Unaccompanied	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Student Dormitories[1]	20.45	49%	10.02	264	3.0	3.7	11	1,499,378	34.4	0.5695	42.508	1,851,646	169,100.05	436,493	185,435	4.26	7,014	4,864
Permanent Party Dormitories[1]	20.45	49%	10.02	475	3.0	2.0	6	1,499,378	34.4	0.5695	23.292	1,014,600	169,100.05	436,493	185,435	4.26	2,136	1,481
Industrial	20.12	54%	10.78	750	3.0	1.0	3	923,953	21.2	0.4064	8.177	356,168	118,722.79	469,404	243,195	5.58	475	329
Medical	12.52	65%	8.12	500	8.0	1.0	8	94,284	2.2	0.0190	0.237	10,345	1,293.18	353,910	244,538	5.61	21	14
Open Space	27.77	17%	4.60	NA	NA	NA	NA	30,222	0.7	0.0029	NA	NA	NA	200,566	NA	NA	NA	NA
Outdoor Recreation	0.02	12%	0.00	NA	NA	NA	NA	1,827,667	42.0	0.5353	NA	NA	NA	100	NA	NA	NA	NA
Technical Training	20.12	69%	13.87	100	3.0	3.7	11	795,968	18.3	0.2055	15.297	666,356	60,032.09	604,334	377,470	8.67	6,664	4,621
Total	131.05		62.35					12,571,532	289			4,040,886				30.88	16,820	11,664
												1,238,558	Associated Demo for construction to occur.					
												2,802,329	Net added Building Space					

Note:
Approximately 1,238,558 square feet of demolition must occur prior to construction. Therefore, the new added building space is approximately 2,802,329 square feet.

[1]50 percent of total unaccompanied housing.
NA not applicable

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Appendix C

Utility Summary Data

APPENDIX C

UTILITY SUMMARY DATA

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Table C-1
Fiscal Year 2004 Estimated Monthly Utility Data

Electrical

	TOTAL AMOUNT	BASE AMOUNT	MFH AMOUNT	Harrison Court MFH AMOUNT	Other AMOUNT
Jan-03	10,551,139	8,881,163	1,608,498	56,400	0
Feb-03	10,417,432	7,748,506	2,369,854	69,000	227,760
Mar-03	10,126,248	8,810,297	933,799	80,400	300,480
Apr-03	12,173,557	10,577,397	1,171,597	110,400	313,200
May-03					
Jun-03	16,395,114	13,518,098	2,343,472	168,000	364,080
Jul-03	18,219,320	15,255,221	2,355,777	160,200	446,880
Aug-03	17,109,664	14,768,113	1,842,217	187,200	309,120
Sep-03	19,433,800	16,190,531	2,774,829	126,600	340,800
Oct-04	14,590,373	12,977,727	1,199,541	103,800	308,880
Nov-04	14,195,636	11,295,260	1,568,541	73,200	1,258,635
Dec-04	11,376,123	10,017,531	1,027,091	66,000	263,280
Jan-05	11,668,549	9,976,619	976,662	58,800	654,754
Feb-05	10,737,602	8,797,020	1,093,046	49,800	797,146
Mar-05	11,239,873	9,203,176	1,216,958	59,400	759,919
Apr-05	11,840,904	9,616,793	1,251,493	69,000	903,427
May-05	12,307,280	9,612,735	1,676,326	100,200	917,477
Jun-05	16,794,731	13,329,416	2,343,582	123,000	997,930
Jul-05	16,638,803	12,644,592	2,512,389	111,000	1,370,173
Aug-05	17,074,619	13,047,704	2,984,519	0	1,042,396
Sep-05	13,403,699	11,093,830	1,540,397	279,000	489,679
Average	13,522,896	10,813,543	1,732,819	94,467	881,433

Base includes Base, Hospital, and MWR
Electricity, kWh

Natural Gas

	TOTAL AMOUNT	BASE AMOUNT	MFH AMOUNT	Harrison Court MFH AMOUNT	Other AMOUNT
Jan-03	57,713	48,736	8,289	260	428
Feb-03	50,643	42,159	7,604	710	170
Mar-03	41,535	33,591	7,245	478	221
Apr-03	32,950	24,581	7,604	710	55
May-03	28,076	21,183	6,426	181	286
Jun-03	25,531	18,698	6,465	239	129
Jul-03	27,145	20,471	6,368	167	139
Aug-03	27,342	20,106	6,589	285	362
Sep-03	29,365	22,409	6,400	155	401
Oct-04	33,329	26,483	6,406	194	246
Nov-04	35,223	27,783	6,510	459	471
Dec-04	57,713	49,829	7,044	469	371
Jan-05	52,818	40,742	7,837		4,239
Feb-05	45,936	37,466	7,308		1,162
Mar-05	39,533	30,796	7,396		1,341
Apr-05	32,902	25,341	6,538		1,023
May-05	29,957	22,657	6,522		778
Jun-05	25,836	18,172	6,524		1,140
Jul-05	24,696	17,444	6,475		777
Aug-05	21,192	13,890	6,621		681
Sep-05	9,310	4,608	4,451		251
	31,353	23,457	6,630		1,266

Base includes Base, Hospital, and MWR
Gas, one source says MCF: another says kCF MCF = kCF

Table C-1
Fiscal Year 2004 Estimated Monthly Utility Data (cont.)

Sewer

	TOTAL AMOUNT	BASE AMOUNT	MFH AMOUNT	Harrison Court MFH AMOUNT	Other AMOUNT
Jan-03	62,463	45,899	12,880	1,988	1,696
Feb-03	61,303	46,036	11,725	1,848	1,694
Mar-03	62,538	48,248	10,591	2,023	1,676
Apr-03	68,588	51,545	13,373	2,009	1,661
May-03	62,441	46,136	12,517	2,142	1,646
Jun-03	68,562	52,740	12,116	2,037	1,669
Jul-03	79,146	63,055	11,458	3,000	1,633
Aug-03	73,083	57,350	11,916	2,184	1,633
Sep-03	68,898	53,524	11,642	2,093	1,639
Oct-04	62,289	48,554	11,402	2,219	114
Nov-04	63,584	49,014	12,582	2,191	1,988
Dec-04	61,135	47,037	11,639	2,345	114
Jan-05	53,130	38,953	10,069	1,750	2,358
Feb-05	52,180	38,612	9,917	1,960	1,691
Mar-05	45,740	31,189	8,683	2,170	3,698
Apr-05	67,570	53,912	9,505	2,100	2,053
May-05	60,667	47,636	8,883	2,107	2,041
Jun-05	59,083	46,347	8,528	2,163	2,045
Jul-05	64,100	52,020	7,938	2,100	2,042
Aug-05	61,260	49,066	8,007	2,170	2,017
Sep-05	61,350	57,287	2,040	0	2,023
	58,342	46,114	8,174	1,836	2,219

Base includes Base, Hospital, and MWR
Sewage, 1000 gallons(kGal)

Water

Total Water for Oct -03 through Sep 04 - From H2O Plant Water Plant Quantities FY-04

Table C-2
Fiscal Year 2004 Estimated Daily Average Utility Data

Electrical

	TOTAL AMOUNT	BASE AMOUNT	MFH AMOUNT	Harrison Court MFH AMOUNT	Other AMOUNT
Jan-03	340,359	286,489	51,887	1,819	0
Feb-03	372,051	276,732	84,638	2,464	8,134
Mar-03	326,653	284,203	30,123	2,594	9,693
Apr-03	405,785	352,580	39,053	3,680	10,440
May-03	0	0	0	0	0
Jun-03	546,504	450,603	78,116	5,600	12,136
Jul-03	587,720	492,104	75,993	5,168	14,415
Aug-03	551,925	476,391	59,426	6,039	9,972
Sep-03	647,793	539,684	92,494	4,220	11,360
Oct-04	470,657	418,636	38,695	3,348	9,964
Nov-04	457,924	364,363	50,598	2,361	40,601
Dec-04	366,972	323,146	33,132	2,129	8,493
Jan-05	376,405	321,826	31,505	1,897	21,121
Feb-05	383,486	314,179	39,037	1,779	28,470
Mar-05	362,577	296,877	39,257	1,916	24,514
Apr-05	394,697	320,560	41,716	2,300	30,114
May-05	397,009	310,088	54,075	3,232	29,596
Jun-05	559,824	444,314	78,119	4,100	33,264
Jul-05	536,736	407,890	81,045	3,581	44,199
Aug-05	550,794	420,894	96,275	0	33,626
Sep-05	432,377	357,865	49,690	9,000	15,796
AVERAGE	440,788	358,387	52,762	2,970	26,646

Base includes Base, Hospital, and MWR
Electricity, kWh

Natural Gas

	TOTAL AMOUNT	BASE AMOUNT	MFH AMOUNT	Harrison Court MFH AMOUNT	Other AMOUNT
Jan-03	1,862	1,572	267	8	14
Feb-03	1,809	1,506	272	25	6
Mar-03	1,340	1,084	234	15	7
Apr-03	1,098	819	253	24	2
May-03	906	683	207	6	9
Jun-03	851	623	216	8	4
Jul-03	876	660	205	5	4
Aug-03	882	649	213	9	12
Sep-03	979	747	213	5	13
Oct-04	1,075	854	207	6	8
Nov-04	1,136	896	210	15	15
Dec-04	1,862	1,607	227	15	12
Jan-05	1,704	1,314	253	0	137
Feb-05	1,641	1,338	261	0	42
Mar-05	1,275	993	239	0	43
Apr-05	1,097	845	218	0	34
May-05	966	731	210	0	25
Jun-05	861	606	217	0	38
Jul-05	797	563	209	0	25
Aug-05	684	448	214	0	22
Sep-05	300	149	144	0	8
	1,116	862	217	3	34

Base includes Base, Hospital, and MWR
Gas, MCF

Table C-2
Fiscal Year 2004 Estimated Daily Average Utility Data (cont.)

Sewer

	TOTAL AMOUNT	BASE AMOUNT	MFH AMOUNT	Harrison Court MFH AMOUNT	Other AMOUNT
Jan-03	2,015	1,481	415	64	55
Feb-03	2,189	1,644	419	66	61
Mar-03	2,017	1,556	342	65	54
Apr-03	2,286	1,718	446	67	55
May-03	2,014	1,488	404	69	53
Jun-03	2,285	1,758	404	68	56
Jul-03	2,553	2,034	370	97	53
Aug-03	2,358	1,850	384	70	53
Sep-03	2,297	1,784	388	70	55
Oct-04	2,009	1,566	368	72	4
Nov-04	2,051	1,581	406	71	64
Dec-04	1,972	1,517	375	76	4
Jan-05	1,714	1,257	325	56	76
Feb-05	1,864	1,379	354	70	60
Mar-05	1,475	1,006	280	70	119
Apr-05	2,252	1,797	317	70	68
May-05	1,957	1,537	287	68	66
Jun-05	1,969	1,545	284	72	68
Jul-05	2,068	1,678	256	68	66
Aug-05	1,976	1,583	258	70	65
Sep-05	1,979	1,848	66	0	65
	1,941	1,524	298	64	60

Base includes Base, Hospital, and MWR

Water

TOTAL AMOUNT	BASE AMOUNT	MFH AMOUNT	Harrison Court MFH AMOUNT	Other AMOUNT

Total Water for Oct -03 through Sep 04 - From H2O Plant Water Plant Quantities FY-04

Base includes Base, Hospital, and MWR

Appendix C

Socioeconomics Impact Calculations

APPENDIX C

SOCIOECONOMICS IMPACT CALCULATIONS

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Socioeconomics Population Impacts Calculations

BASELINE

	Living On Base	Living Off Base	Total
Personnel	2,046	7,985	10,031
Military Dependents	2,328	4,706	7,034
Student Personnel	4,476	0	4,476
Transient Personnel	1,366	0	1,366
Population	10,216	12,691	22,907

ADDED CAPACITY

	Living On Base	Living Off Base	Total
Personnel	221	5,139	5,360
Military Dependents	1,178	2,581	3,759
Student Personnel	4,522	0	4,522
Transient Personnel	656	0	656
Population	6,577	7,720	14,297

TOTAL IMPACT

	Living On Base	Living Off Base	Total
Personnel	2,267	13,124	15,391
Military Dependents	3,506	7,287	10,793
Student Personnel	8,998	0	8,998
Transient Personnel	2,022	0	2,022
Population	16,793	20,411	37,204

Appendix D

Notice of Availability and Public Notification

APPENDIX D

NOTICE OF AVAILABILITY

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PUBLISHED IN THE OCTOBER 22, 2006 *BILOXI SUN HERALD*

PUBLIC NOTICE

The United States Air Force Invites Public Comment

Environmental Assessment for Hurricane Katrina Recovery and Installation Development at Keesler Air Force Base, Mississippi

The 81st Training Wing, Keesler Air Force Base (AFB), Mississippi, has prepared a draft environmental assessment (EA), proposed Finding of No Significant Impact (FONSI), and Finding of No Practicable Alternative (FONPA) for Hurricane Katrina Recovery and Installation Development at the installation. The EA, prepared in accordance with the National Environmental Policy Act and Air Force instructions, evaluates potential impacts of the proposed action, alternative action, and no action alternative on the environment. The EA evaluated noise, land use, earth resources, water resources, hazardous materials and waste, biological resources, utilities and infrastructure, socioeconomics, air quality, and cultural resources.

A copy of the EA, proposed FONSI, and proposed FONPA are available for review at the Keesler AFB web site www.keesler.af.mil and at the West Biloxi Public Library, 2047 Pass Road, Biloxi, Mississippi.

Written comments may be submitted through November 21, 2006 and should be directed to: 81 TRW / PA, 517 L Street, Room 113C, Keesler AFB, Mississippi, 39534 or e-mail to 81trw-pa1@keesler.af.mil

PRIVACY ADVISORY: Comments on this draft EA are requested. Letters or other public comment documents provided may be published in the final EA. Information provided will be used only to improve analysis of issues in the draft EA. Comments will be addressed in the final EA and made available to the public. However, only the name of the individual and specific comments will be disclosed.

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ACRONYMS AND ABBREVIATIONS (CONT.)

LOS	level of service
LTM	long term monitoring
LTO	landing-takeoff
LUC	land use controls
MDAH	Mississippi Department of Archives and History
MDE	Mississippi Department of Education
MDEQ	Mississippi Department of Environmental Quality
MDOT	Mississippi Department of Transportation
MFH	Military Family Housing
mg/m^3	milligrams per cubic meter
mgd	million gallons per day
MMCC	Mississippi Military Communities Council
MOA	Military Operations Area
MPCo	Mississippi Power Company
MSA	Metropolitan Statistical Area
NA	not applicable
NAAQS	national ambient air quality standards
NEI	National Emissions Inventory
NEPA	*National Environmental Policy Act*
NHPA	*National Historic Preservation Act*
NM	nautical miles
No.	number
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_x	nitrogen oxide
NOTAM	Notices to Airmen
NPDES	National Pollutant Discharge Elimination System
NPS	non-prior service
NRHP	National Register of Historic Places
O_3	ozone
Pb	lead
PCB	polychlorinated biphenyl
P.L.	Public Law
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to 10 microns
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to 2.5 microns
POL	petroleum, oil, and lubricant
ppm	parts per million
PSD	prevention of significant deterioration
RCRA	*Resource Conservation and Recovery Act*
ROI	region of influence
RV	Recreational Vehicle
SAIC	Science Applications International Corporation
SEL	sound exposure level
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_x	sulfur oxide
SO_2	sulfur dioxide
SPCC	spill prevention control and countermeasure
SUA	Special Use Airspace
SV/FMO	Services/Furniture Management Office
SWMU	Solid Waste Management Unit
SWPPP	Stormwater Pollution Prevention Plan
TEL	tetraethyl lead
TGO	touch-and-go
tpy	tons per year
TSP	total suspended particulate
US	United States
USAF	United States Air Force
USC	*United States Code*
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UST	underground storage tank
VA	Department of Veterans Affairs
VFR	Visual Flight Rule
VOC	volatile organic compound
VQ	Visiting Quarters